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Introduction

1.1 Product Overview

GraphXMASTER™ RPMS-D100U/UF, CS50-D100U and CS70-D100U/UF products are based on single chip DLP™(Digital Light Processing) technology by Texas Instruments with SXGA resolution.

The *RPMS-D100U/UF* (Rear Projection Module) is a dual lamp projector that has been specifically designed for rear screen projection applications. This purpose-built projector is designed with a flexible mounting base so that it can be fitted with various mounting systems. It can also be configured for 0 degree or 90

degree projection. This flexibility makes the RPMS suitable for nearly any application. Another feature of the RPMS is the built in 6-axis adjustment mechanism, which allows for precise geometric alignment with the screen – an important detail for rear screen tiling applications.

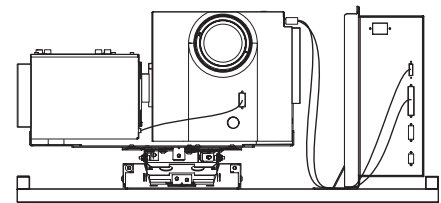


Figure 1.1 RPMS-D100U

The *CS50-D100U & CS70-D100U/UF* display cubes are designed to suit many different applications and are an ideal choice for rear projection tiled display walls in control rooms and 24/7 monitoring applications. They provide uniform brightness and ultimate color matching between screens to create impressive clear, sharp, seamless images.

Key features (Refer to Section 5 for a complete list of Specifications)

- ◇ SXGA (1280 x 1024) native resolution with other resolutions fully scaleable in *D100U* models only.
- ◇ Variable Brightness (*dependant on lamp power and white boost setting*)
- ◇ User selectable dual lamp or single lamp operation modes
- ◇ Automatic lamp switching for continuous operation
- ◇ Intuitive user menu system
- ◇ Input selection with keypad
- ◇ Built-in RS-232 and RS-422 ports for computer and network projectors
- ◇ 6-Axis adjustment mechanism to fine tune image geometry
- ◇ Low distortion lens (0.76:1 or 1.25:1)
- ◇ Lens horizontal or lens vertical configurations (*CS50/CS70, lens vertical*)
- ◇ 50" – 120" diagonal image size (5:4 aspect ratio)
- ◇ 24-bit RGB display
- ◇ Control with IR or wired keypad
- ◇ Built in RS-232 for control via external computer, etc.
- ◇ Modular, industrial design for ease of servicing and installation

How the projector works in Single or Dual Lamp Modes

- The projector accepts an SXGA input signal from an external source. When in **Dual Lamp** operation mode, the output from both lamps is directed to a 90° prism. Due to the placement of the prism, in relation to the lamps, only half of the lamps output is reflected and the light that doesn't fall incident on the prism is passed on to the parabolic reflectors inside each of the lamp modules. After one pass around the system, the light joins the rest of the light that has been reflected off of the prism and into the focusing lenses. The combined light is then passed through the integrator and presented to a spinning color wheel where it is sequentially filtered into its RGB color primaries and presented to the single DMD™ (in sequence). Reflected light from the DMD™ chip then passes through the projection lens and is displayed on a screen for viewing.

In **Single Lamp** operation mode, light is passed through the system in the same manner, but only one lamp is on and light output is reduced by half.

NOTE: The RPMS and CS70 include a four-segment color wheel (red, green, blue and white). The CS50 includes a six-segment color wheel without a white segment (red, green, blue, red, green, blue).

1.2 Components

Each projection system is provided with a User's Kit, which includes items required in the setup and maintenance of the projector. Check the User's Kit to ensure you have received the following items:

- ◆ User's Manual
- ◆ Installation Guide
- ◆ IR remote keypad with batteries
- ◆ Assorted ball nose drivers

NOTE: Additional User's Kits can be purchased separately. Reference CHRISTIE #38-804867-01 for RPMS-D100U/UF and #38-804827-01 for CS50-D100U, CS70-D100U/UF when ordering.

1.3 Purchase Record and Servicing

Whether the projector is under warranty or the warranty has expired, Christie's highly trained and extensive factory and dealer service network is always available to quickly diagnose and correct projector malfunctions. Service manuals and updates are available to service technicians for all projectors.

If you encounter any problems with the projector and require assistance, contact your dealer or Christie Digital Systems. Fill out the information in the table below and keep with your records for future reference.

Purchase Record

Dealer:
Dealer Phone Number:
Projector Serial Number:
Purchase Date:
Installation Date, if applicable:

NOTE: The projector serial number can be found below the adjustment mechanism on the mounting plate.

You can also register your product on-line by visiting **www.christiedigital.com** ⇒ **Service and Support** ⇒ **Product Registration**. This will keep you in touch with all the latest product information, such as updates, technical bulletins, downloads and Christie newsletters.

Source Setup

2.1. Introduction

This section provides instructions on how to connect various sources to the projector.

2.2. Source Connections

A variety of external sources can be connected to the input ports on the Electronics Module (EM) main input panel. Figure 2.1. illustrates the differences between EM models *D100U* (left) and *D100UF* (fixed frequency shown on right).

NOTE: The EM is vertically mounted to the projector's mounting rails (orientation illustrated in Figure 2.1.). For the purpose of illustrating source connections, it will be shown in a horizontal position.

Various Optional Input Modules
can be installed in Input 2 and
an optional video decoder can
be installed in Input 3 & 4
see Appendix D

Switcher port
available

DVI Input on
front panel

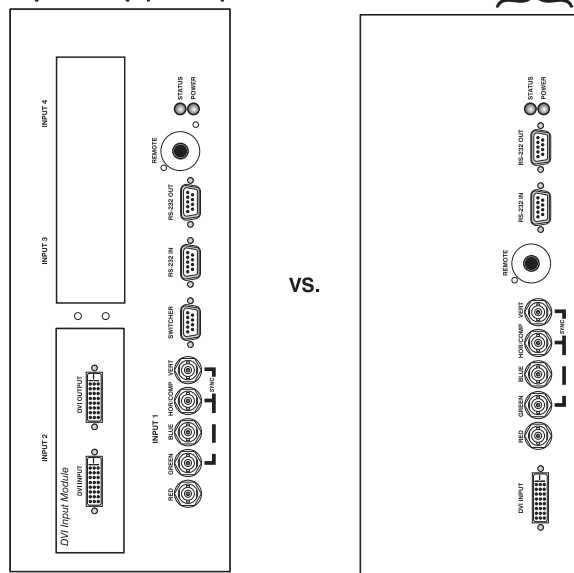


Figure 2.1. Comparing connector availability between model models

RGBHV (5 BNCs) ➤ Input 1 provides 5 BNC connectors for connecting to a variety of sources such as VGA, SVGA, XGA, SXGA, Mac, PowerMac, DEC, Sun, SGI and others. This projector supports multiple sync types with RGB signals: sync-on-green, composite sync, and separate H & V syncs.

To properly connect RGB sources to INPUT 1 use the table and illustration below (Figure 2.2.). *NOTE: Front panel shown for the D100U model – connection is the same for D100UF.*

RGB Source Outputs	Connectors at INPUT 1 (5 BNCs)				
	Red	Green	Blue	Hor/Comp	Vert
sync-on-green	✓	✓	✓		
composite sync	✓	✓	✓	✓	
separate horizontal and vertical sync	✓	✓	✓	✓	✓

NOTE: Connect the Sync BNC inputs first.

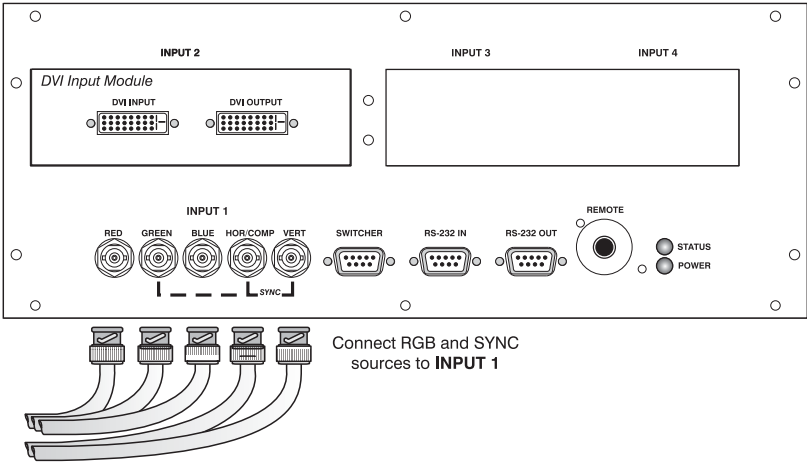


Figure 2.2. Connecting RGBHV sources

Component Video (YPbPr) ➤ Connect a YPbPr signal (*component video*) to INPUT 1. See Figure 2.3.

*NOTES: 1) Not applicable to D100UF models. 2) If, for some reason, the projector fails to recognize a YPbPr signal, specify this **Color Space** option within the **Image Settings** menu. 2) Do not connect digital component signals to INPUT 1. Use the appropriate digital interface installed at INPUT 2.*

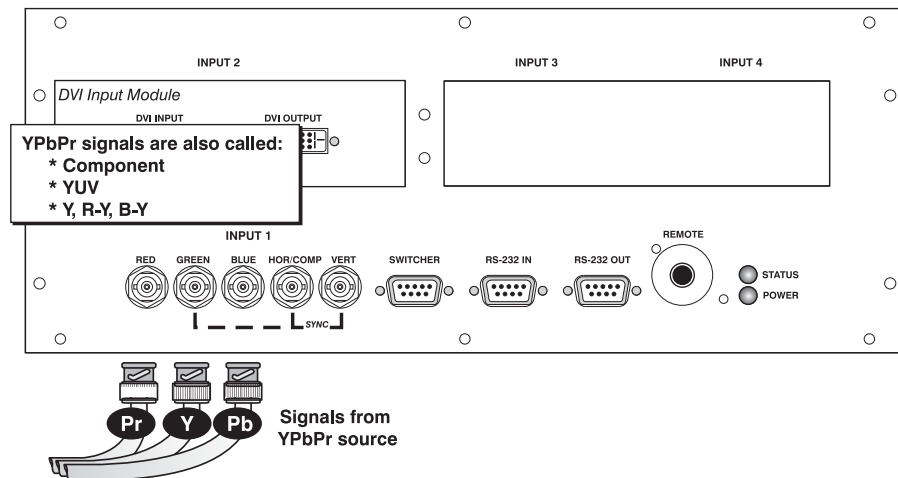


Figure 2.3. Connecting Component Video Sources

DVI Digital Video Signals ➤ The DVI Input module installed in INPUT 2 displays digital video input signals conforming to the DVI (Digital Visual Interface) standard. This is a standard module in *D100U* projector models only.

DVI Connection for D100U models

To connect an incoming digital video signal to the projector, connect the cable running from the source to the DVI input connector at Input 2 - the DVI output adjacent to the DVI input connector remains empty. If you want to loop the source through to another display device, connect a cable from the DVI output connector (that was empty) to a DVI input connector on the digital display.

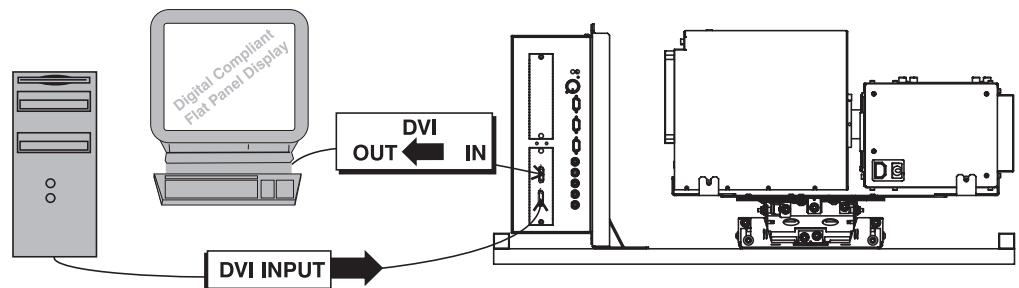


Figure 2.4. Connecting a Digital Video Input Signal

NOTE: The DVI output connector (J94) on the output panel is used to connect the Projection Head Module (PHM) and Electronics Module (EM).

DVI Loop Through for D100U models

To loop a single incoming digital video input signal (connected to the DVI input) through to another projector connect a cable from the source to the DVI input connector on the main input panel. Take another cable and connect it to the DVI output connector (adjacent to DVI input) and connect it to the DVI input connector of the next projector. Continue looping connection to all projectors – your last projector will have an empty DVI output connector.

NOTES: 1) When looping a DVI input signal, all projectors will display the same data from that one source.

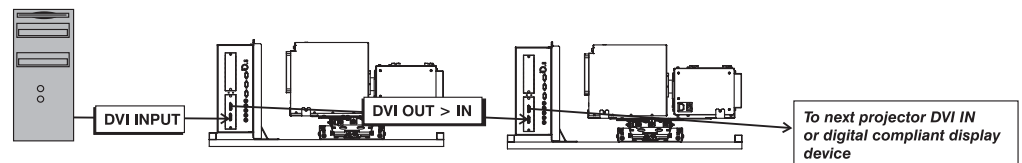


Figure 2.5. Loop Digital Video Input Signals

DVI Connection for D100UF models

The DVI input connector available in *D100UF* models accepts DVI standard input signals in the projector's native resolution only. No loop-through or resizing ability available on these projectors.

Typical connection to this port is shown in Figure 2.6.

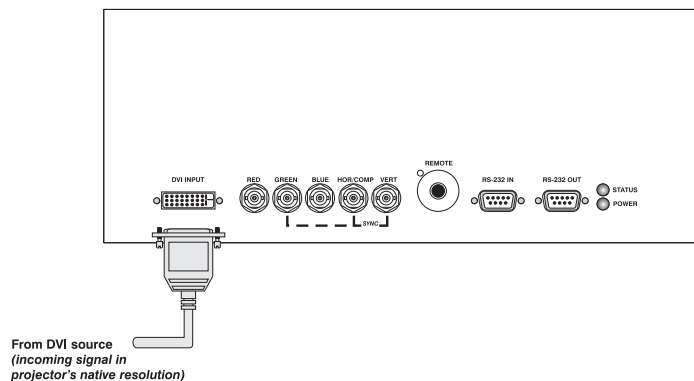


Figure 2.6. Connecting a Digital Video Input Signal to RPMS-500Xef

Composite Video ➤ Connect a composite video input to either the BNC connector or the RCA jack provided on the video decoder module (**INPUT 3**).

*NOTE: 1) Requires Optional Video Decoder (38-804600-01). 2) If you want to loop a composite signal through to another projector or display device, see **Video Loop Through** later in this section. 2) Not applicable to D100UF.*

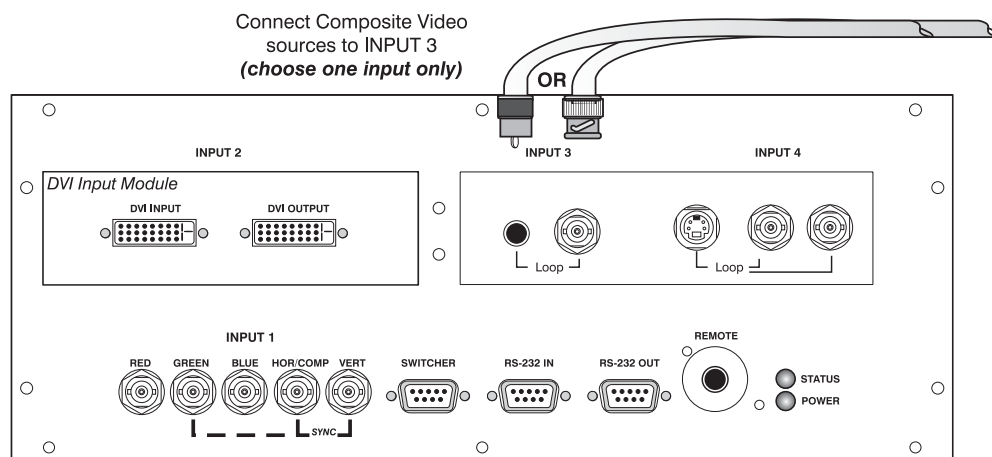


Figure 2.7. Connecting Composite Video Sources

S-Video ➤ Connect an S-Video input to either the 4-pin mini DIN connector or the Y and C BNC connectors provided on the video decoder module (**INPUT 4**).

NOTE: 1) Requires Optional Video Decoder module (38-804600-01). 2) Not applicable to D100UF.

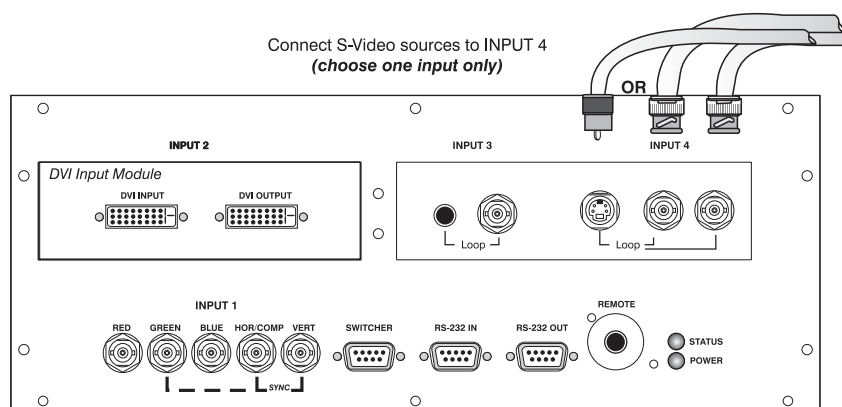


Figure 2.8. Connecting S-Video Sources

Video Loop Through ➤ To loop a single incoming video input signal (connected at the video decoder) through to another projector or display device, use the empty connector(s) adjacent to this same input as described below.

Composite Video Loop Through

CONNECTIONS: From your source, connect a composite video signal to **INPUT 3** using either the small RCA plug or the adjacent BNC. Connect a second cable from whichever **INPUT 3** connector is free to one of the composite video inputs of the next display device or projector. Continue this looping method for each projector, using either the phono-plug or the adjacent BNC as input into **INPUT 3**, then using the other connector as an output (i.e., loop through). Whether you use the BNC or the phono plug as input or output depends on the type of cable you have on hand and what type of connectors are on each end.

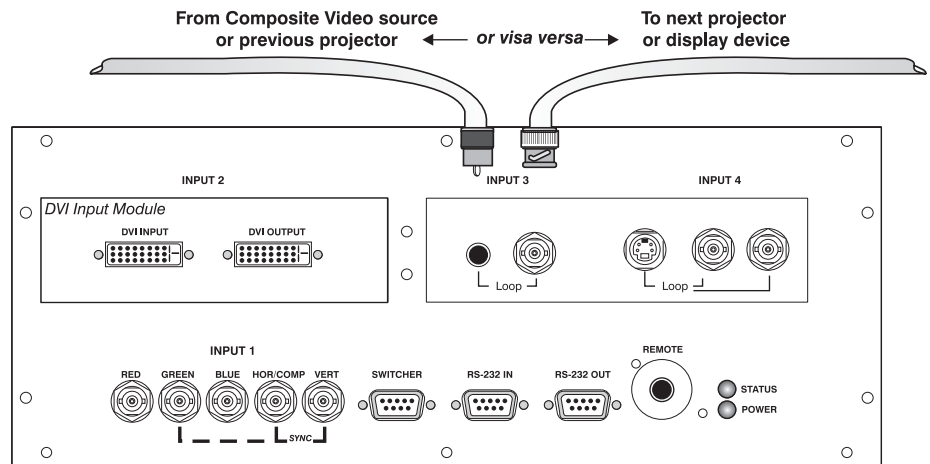


Figure 2.9. Composite Video Loop Through

VIDEO TERMINATION: In the *Video Options* menu (*Image Settings*), make sure **Video Termination** is checked for the final projector *only*. All other projectors must have this option unchecked in order for the signal to continue. For other types of display devices in the chain, typically a “Hi-Z” switch position is needed.

S-Video Loop Through

CONNECTIONS: From your source, connect an S-video source signal to **INPUT 4** using either the 4-pin mini DIN or the 2 adjacent BNCs labeled Y and C. Connect a second cable from whichever **INPUT 4** connector is free to one of the S-video inputs of the next display device or projector. Continue this looping method for each projector, using either 4-pin mini DIN or the 2 adjacent BNCs as input into **INPUT 4**, then using the other connector(s) as an output (i.e., loop through). Whether you use 4-pin mini DIN or the 2 adjacent BNCs as input or output depends on the type of cable you have on hand and what type of connectors are on each end.

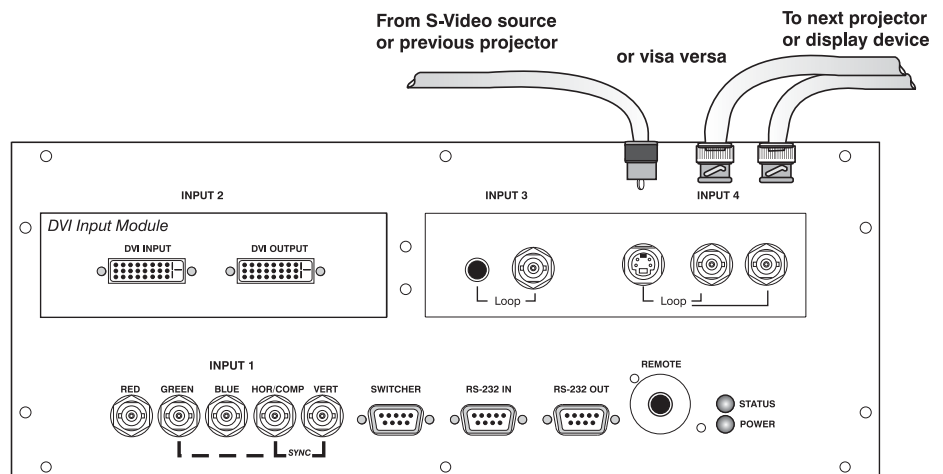


Figure 2.10. S-Video Loop Through

VIDEO TERMINATION: In the *Video Options* menu (*Image Settings*), make sure **Video Termination** is checked for *only* the final projector. All other projectors must have this option unchecked in order for the signal to continue. For other types of display devices in the chain, typically a “Hi-Z” switch position is needed.

- Extra Video** ➤ If you want to use an extra video source in addition to the video source(s) connected at **INPUT 3** or **INPUT 4** connect either a Composite or S-Video source to **INPUT 1** as shown in. Do not connect both types here simultaneously. *NOTE: For additional video inputs remove the DVI Input module and install an optional Composite/S-Video Input Module at **INPUT 2**.*
- COMPOSITE OR S-VIDEO**

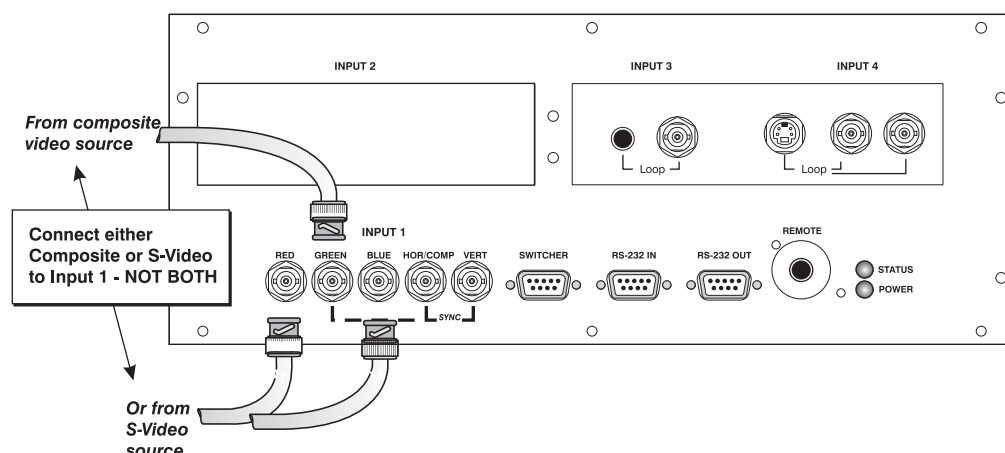


Figure 2.11. Connecting Extra Video

- Optional Inputs** ➤ Christie offers optional modules that allow you accommodate different signal types, whether analog or digital. Any one of these modules can be installed in D100U models, in the area labeled **INPUT 2**. They include:

- RGB 500 Input Module (38-804606-xx)
- RGB 400 Active Loop Thru Input Module (38-804607-xx)
- RGB 400 Buffered Amplifier Input Module (38-804610-xx)
- Composite/S-Video Input Module (38-804608-xx)
- PC250 Analog Input Module (38-804609-xx)
- Serial Digital Input Module (38-804602-xx)
- Digital HDTV Input Module (38-804611-xx)
- Video Decoder Module (38-804600-01)

NOTES: 1) Connect analog HDTV signals directly to **INPUT 1** or to any “RGB” input module installed at **INPUT 2**—the optional HDTV Input Module used in earlier Christie projector models is not needed or recommended. 2) See **Appendix E, Optional Input Modules** for a brief description of each interface.

- Connecting a switcher** ➤ You can use one or more external *Marquee™ Signal Switchers* or a third party switcher in order to significantly increase the number of sources you can select. If you are using a *Marquee™ Signal Switcher*, connect the switcher’s RGB output to **INPUT 1** and connect an RS-232 serial communication cable between the switcher and the projector serial port labeled **SWITCHER** (see Figure 2.12). The switcher communication link (permanently set at 9600 baud) enables you to access inputs connected to the switcher in the same manner as those connected directly to the projector. For most other third-party switchers, connect and access sources according to the documentation provided with that switcher. Use high quality shielded cables.

NOTE: Make sure any *Marquee™ Signal Switcher* connected directly to the projector is set as “Switcher #1”. If it is not, unplug the switcher and turn the thumbwheel to “1” before plugging back in and connecting to the projector and/or network.

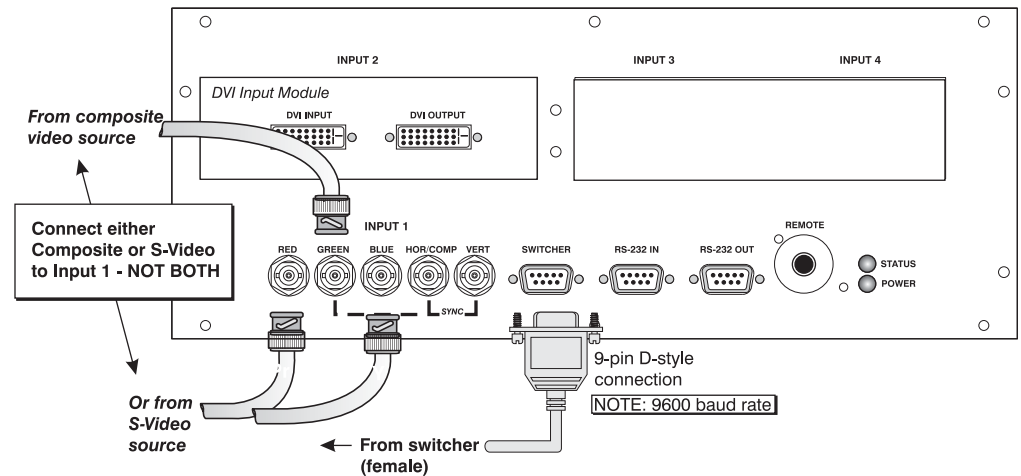


Figure 2.12. Connecting a Marquee™ Signal Switcher

Connecting Multiple Switchers

► If you are using more than one *Marquee™ Signal Switcher*, daisy-chain the RS-232 switcher inputs/outputs together to form a complete network of inputs accessible from the projector (you can network up to 9 switchers), and connect Switcher #1 to the projector as shown in Figure 2.12. In addition, connect the RGB output from each switcher to its matching slot on switcher #1—for example, connect the RGB output from switcher #2 to slot #2 on switcher #1, and the RGB output from switcher #3 to slot #3 on switcher #1. Note that slots used in this manner on switcher #1 are no longer recognized as inputs to the projector—if you select a slot location that is connected to another switcher’s RGB output, the projector will display the “no input signal” error message.

2.3 Serial Port Connections

Multiple projectors can be connected via the serial port inputs on the input panel for control using serial communication commands, otherwise known as RS-232.

Connection: Located just below the video decoder module are two 9-Pin DIN connectors dedicated to serial communication. Using the appropriate serial communication cables (see **Appendix D**) connect the controlling source (PC) to the RS-232 IN connector.

NOTE: A third RS-232 serial port, located on the main input panel of the EM, is intended for future use only.

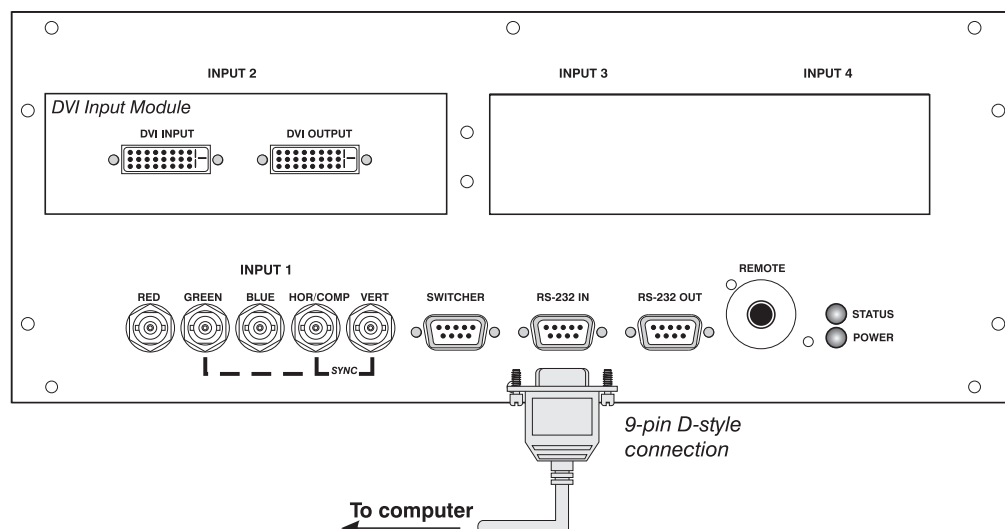


Figure 2.13. Connecting to the RS-232 input connector

When connecting multiple projectors in a network with serial communication, connect the controlling source to the RS-232 IN connector of the first projector in the network. Then take another serial communication cable and connect one end to the RS-232 OUT connector and the other end to the RS-232 IN connector of the next projector. Continue this pattern of connection with all projectors. The last projector in the network will only have a connection to the RS-232 IN.

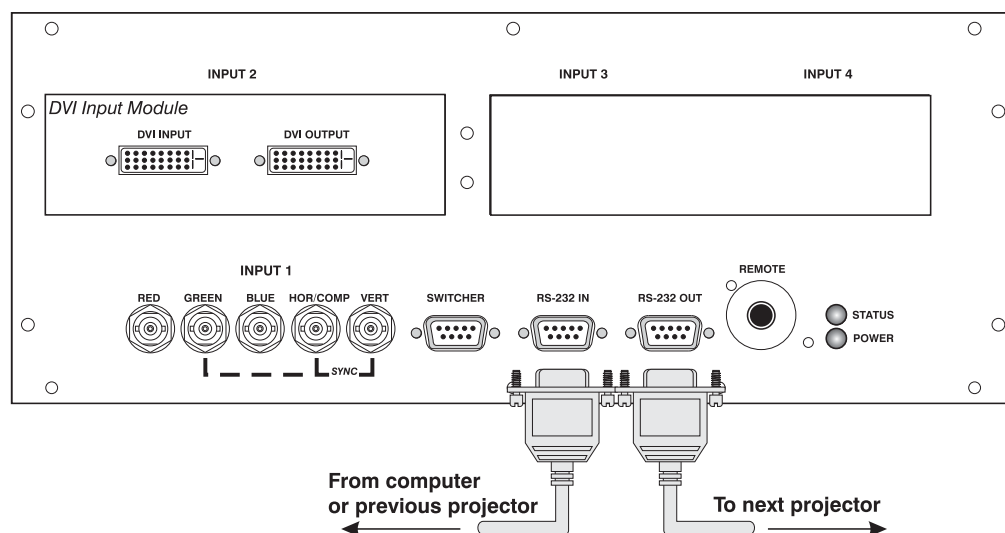


Figure 2.14. Looping RS-232 cables between multiple projectors

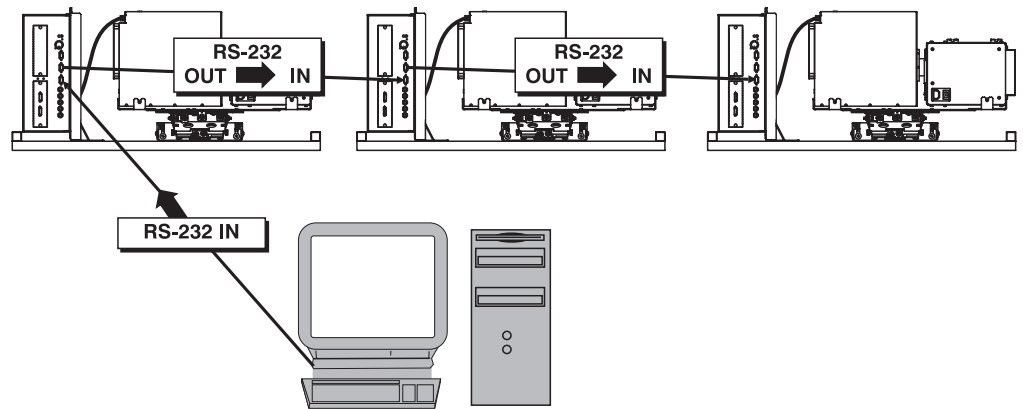


Figure 2.15. Connecting RS-232 between multiple projectors

2.4 Power Connection

Plug the projector's line cord into the AC receptacle accessible from the rear of the projector in the bottom left corner of the Dual Lamp Module (DLM). Then plug the 3-pronged end of the line cord into a grounded AC outlet. Input voltage to *D100U* and *D100UF* models must be capable of **100-240 VAC**. ***Use the proper power source and the rated line cord provided (North America only).*** See Section 5, *Specifications* for all power requirements.

WARNING

Do not attempt operation if the AC supply and cord are not within the specified voltage and power range.

⚠ Caution: Once the projector is powered down, wait approximately 10 minutes to allow the lamps to cool sufficiently before unplugging the projector from the AC outlet.

2.5 Keypad Protocol

At manufacture every keypad is assigned "A" as its default protocol, which is simply a collection of settings that determine how the keypad operates. Once assigned, this protocol remains in effect until it is changed—that is, the keypad will operate as it currently does until you change its protocol.

Protocols are most useful for multiple-projector applications. For example, you might want to change a keypad protocol if you are working with two projectors and two remote keypads in the same room and need to control each projector independently (Figure 2.16). When Keypad A has a different protocol than Keypad B, each keypad communicates *only* with the projector having a matching protocol. Or, if you have a network of two or more projectors connected together via RS-232 serial ports, you may want only certain projectors to respond to a wired keypad, thus you can use different protocols to limit responses.

NOTE: Matching the protocol on the projector to that of a keypad is done through a setting in the **Communications** menu. See menu descriptions for further information on how to change the projector's infrared sensor (rear and front) protocol.

A protocol for either type of remote keypad — IR or wired — can be changed. A remote can be changed, manually by "hard-wiring" new jumper settings inside the keypad so that they remain in effect until you change the hard wiring. Note that a hard-wired protocol can be temporarily overridden by the software protocol change,

effective until the keypad is unplugged and plugged in again (if a wired remote) or until a battery is removed (if an IR remote).

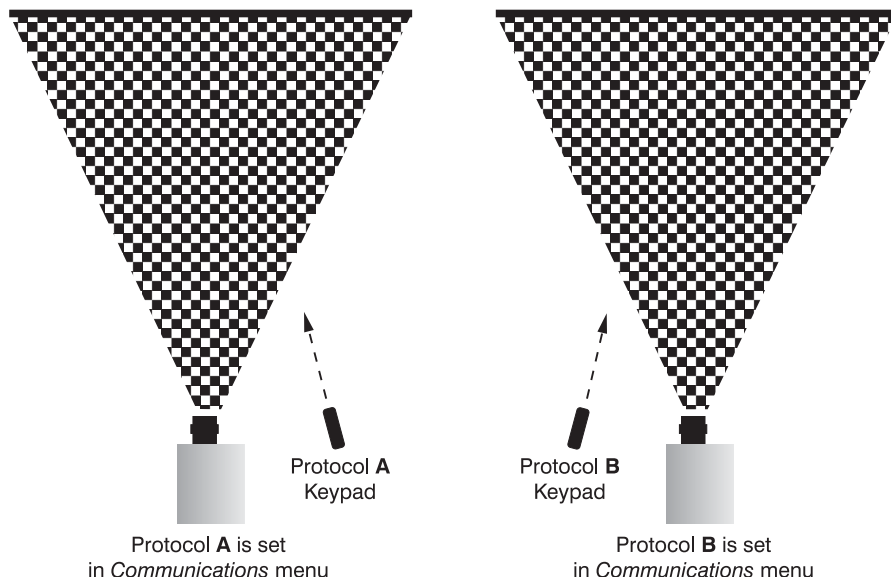


Figure 2.16. Independent Keypads and Projectors

**Remote Keypad ►
Protocol
IR or optional Wired Keypad**

The standard IR remote keypad or the *optional* wired remote can be set to one of two different protocols — “A” or “B”. To hard-wire a protocol to “A” or “B” in either remote, follow Steps 1 through 5:

Step 1

Unplug the keypad from the projector (applies to wired remote only).

Step 2

Unlatch and open the empty battery compartment on the back of the keypad as shown in Figure 2.17.

NOTE: A wired keypad opens as shown, but a cable passes through the battery compartment cover.

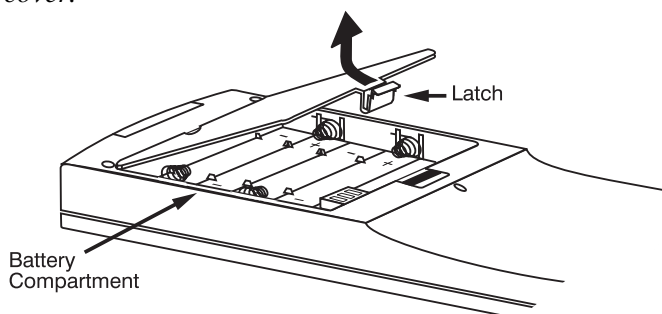


Figure 2.17. Opening the Keypad

Step 3

Find the 4 jumpers located along the latching side of the battery compartment. These jumpers set the keypad protocol and other settings so that the keypad functions in a certain manner.

Step 4: Set the Jumpers

Set the jumpers as shown in Figure 2.18. Refer to the correct part of the drawing — IR or wired (optional). Use tweezers or needle-nose pliers to remove and replace each jumper as necessary.

- **J1** jumper: For either remote, set between pins 1 and 2 to set as Protocol “A”. Set between pins 2 and 3 to set as Protocol “B”.
- **J2** jumper: For either remote, set between pins 2 and 3 as shown; otherwise, the projector will not respond correctly to keypad commands.
- **J3** jumper: For the IR remote, make sure that the jumper is set between pins 2 and 3 as shown. For the wired remote, make sure that the jumper is set between pins 1 and 2 as shown.
- **J4** jumper: For the IR remote, make sure that the jumper is set between pins 1 and 2 as shown. For the wired remote, make sure that the jumper is set between pins 2 and 3 as shown.

Step 5

Replace battery compartment cover. Plug into projector (wired keypad only) and test.

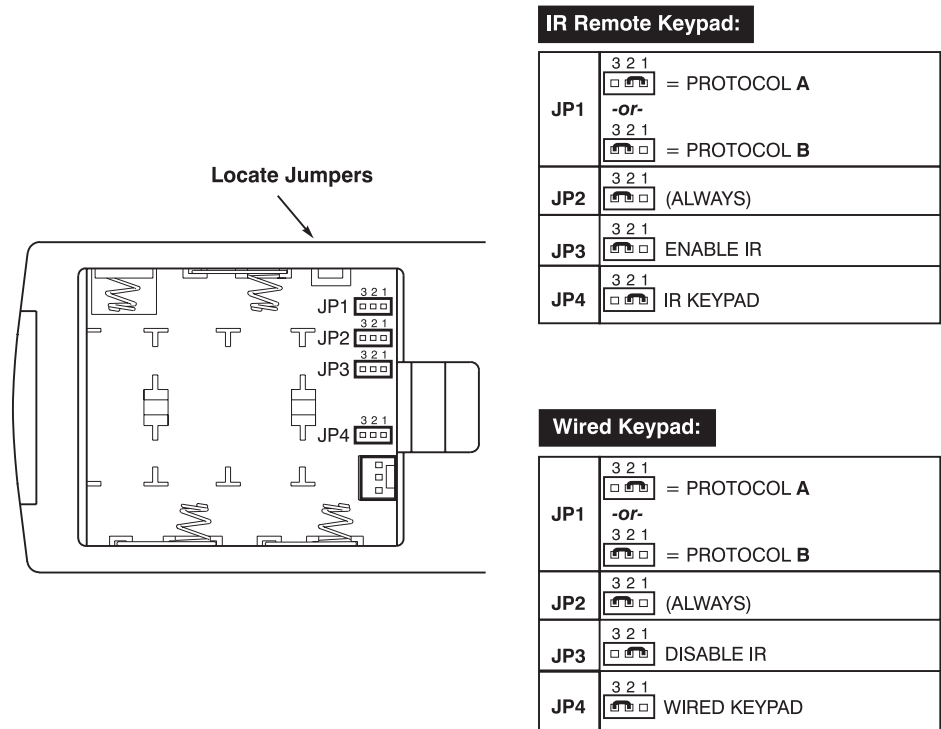


Figure 2.18. Locating and setting keypad jumpers

NOTE: A wired keypad can be converted into an IR remote keypad, and vice versa. Follow the settings shown above, adding or deleting the cable and batteries as required. The cable is available separately from your dealer – #38-804011-01)

Converting a Keypad ➤ If desired, you can convert an IR remote keypad into a wired remote keypad and vice versa.

TO CHANGE FROM INFRARED TO WIRED:

1. Remove battery compartment cover from back of keypad.
2. Remove batteries.
3. Wait 1-2 minutes.
4. Set keypad protocol as desired, using “wired” jumper settings.
5. Plug the keypad cable (available separately) into the empty battery compartment. Make sure that the battery cover is notched smoothly to accommodate the cable.
6. Replace battery compartment cover.
7. Plug into the 3-pin XLR port at the rear panel of the projector.

TO CHANGE FROM WIRED TO INFRARED:

1. Unplug the keypad from the projector.
2. Open the keypad cover and unplug the keypad cable.
3. Wait 1-2 minutes.
4. Set keypad protocol as desired, using “IR” jumper settings.
5. Install batteries (see *Section 4*).
6. Replace battery compartment cover.

Operation

3.1 Introduction

This section provides a general overview of the projector and a complete description of the menu system.

3.2 Projector Basics

The projector's modular architecture is best suited for control room and mission critical environments where ease of servicing is a must and down time must be kept to a minimum. A brief description of each module has been provided in this section. Knowing your projector will help you in times where troubleshooting is necessary.

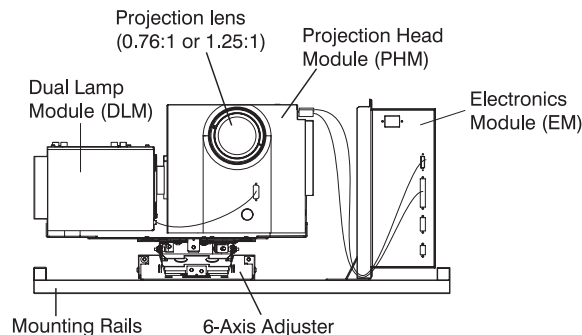


Figure 3.1. Identifying Projector Modules

Projector Head Module (PHM)

The PHM module is the centermost module of the projector. It contains the projection lens (0.76:1 or 1.25:1), IR sensor, color wheel, DMD and other optical components. It also provides the electrical interfaces required to drive these components.

The PHM is connected to the adjacent DLM module. As an assembly, the two modules are mounted to the 6-axis adjustment mechanism. With a quick changeover in mounting brackets the PHM can be removed, rotated 90°, and re-mounted for rear screen projection applications where a first surface optical mirror is used.

Dual Lamp Module (DLM)

The DLM connects to the adjacent PHM module, by a specially designed coupling that allows rotation of the PHM module only. This module houses the two 100W lamps, two lamp drivers, a 390V high voltage power supply (HVPS) and cooling fans.

⚠ The DLM is designed to remain in a horizontal position and does not get rotated 90°, like the PHM.

Electronics Module (EM)

The EM module contains the main electronics and input connectors of the projector. Your projector model identifies which type of EM you have *D100U* or *D100UF*.

Main Input Panel

All source connections are made to the main input panel. *NOTE: The connectors located on the input panel vary between models. See Section 2.*

Auxiliary Fan Connector

A connector exists on the side of the EM and can be used to connect a separate cooling fan – useful in applications where the projector is mounted within the confines of an enclosure and where airflow is required. Refer to *Appendix D* for pinout information.

Status and Power LEDs

Two LEDs are located in the lower right corner of the main input panel, which indicates projector “Status” (top) and “Power” (bottom). During normal operation, the “Power” light is steady green and the “Status” light flashes green each time a key is pressed on the keypad or the projector receives a serial communication command.

6-Axis Adjuster

The projector provides the ability of modifying the geometry of a displayed image using the uniquely designed 6-Axis adjustment mechanism. This mechanism is shipped from the factory in a nominal position and can be adjusted using a 3/16” ball driver. All adjustments made to the adjuster can be “locked” into place by tightening the lock screws and setscrews. Instructions and tools required to adjust the 6-axis can be found in the User’s Kit.

3.3 Using the Keypad

The projector is controlled via an IR remote keypad. The keypad accesses various menus in which settings can be changed and saved into memory (called channels). There are 99 channels in which you can store customized settings for various sources.

The IR remote keypad provided in the User's Kit provides the user with wireless control of the projector of up to 100 feet away. The keypad is operated by 4AA batteries, which require periodic replacement (*Section 4*).

The most effective method of operating the projector is by facing and pointing the keypad directly at the screen. There is only one IR sensor that picks up the transmissions of the keypad and it is located just below the lens. It is important to keep the transmission path clear because any obstruction will limit if not prohibit transmission of commands.

IR Remote Keypad ➤

The IR Remote Keypad controls the projector by way of wireless communications from a battery-powered infrared (IR) transmitter. Use the IR remote keypad the same way you would use a remote keypad supplied with a TV or VCR. When making key presses, point the keypad directly at the center of the screen. The IR sensor, responsible for detecting signal and relaying commands for internal processing, is located just below the projection lens on the PHM.

Wired Remote —OPTIONAL— ➤

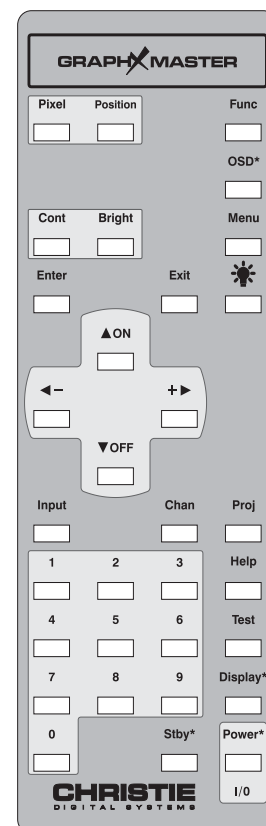
The wired remote keypad connects to the 3-pin XLR jack via a 25 ft. cable. It is recommended when:

- the lighting conditions are unsuitable for proper IR transmission
- you want to use a separate keypad for each projector in a group

NOTES: 1) For extra long distances and/or harsh environments, you may prefer to use an optional remote **Two-Way Controller** to control the projector. For operating details, please see the **Two-Way Controller User's Manual** included with this accessory.

Keep in mind the following guidelines:

1. Press keys one-at-a-time; there are no simultaneous key presses required.
2. For any key having an "*" (Power*), for example), hold the key for approximately 1 second in order to toggle the function with a single key press. For other keys (or to use a "*" key in conjunction with **▲ON** or **▼OFF**), a momentary press similar to a mouse click is sufficient.
3. Press the "lightbulb key" to temporarily illuminate the backlight for the keys without sending any other command.
4. **◀-**, **+▶**, **▲ON**, and **▼OFF** repeat their "arrow" actions when held down. For other keys, release and press again to repeat an action. In a network, pause between adjustments to ensure that the last projector can "keep up" with the commands.



- If you press a key while the projector is busy with another action, such as during a power-up, the key press may not take effect.

When you turn on the projector it begins operating at *presentation level*, such as an image from the most recently used source signal. The projector temporarily leaves presentation level whenever you use the keypad to work with control settings, display menus, or on-line help. For example, pressing **[Menu]** after startup displays the main menu — presentation level is no longer active, although the image still appears in the background. Press **[Menu]** again (or **[Exit]**) to return or leave the menu system and return to presentation level.

Keypad Commands ➤ Specific keypad commands are explained below:

[Power*] Power ON/OFF

Press and hold for approximately 1 second to turn the projector ON or OFF with a single key press. Or press **[Power*]** followed immediately by **[AON]** or **[VOFF]** if you want to guarantee the correct toggle (useful if you are unsure of the present status).

If you power up in Single Lamp mode with a failed lamp, the projector will automatically try re-striking it up to 3 times (after the initial attempt) with a 30 second wait in between each attempt. This could lead to a 2-minute wait before the lamp turns on or is declared, “failed to strike”. If this occurs, the projector continues powering on by trying to turn on the other lamp. The same happens when you power up in Dual Lamp mode and one lamp fails to turn on. The projector tries re-striking the lamp that did not turn on up to 3 times before it reverts to the single lamp mode of operation for the lamp that is on. In either case, there is no indication by the LEDs that anything is occurring. Any key that is pressed during this time is ignored, except for **[Power*]** **[VOFF]**.

NOTES: 1) It is recommended that you wait at least 10 minutes after powering down the projector and before unplugging it from the power outlet. The cooling fans in the projector DO NOT automatically turn off when the lamp is cool. This wait period gives the lamp enough time to cool before unplugging the projector.

[Chan] Channel

Press **[Chan]** to select a specific source setup (*channel*) defined and stored in projector memory. Once you enter a 2-digit channel number (or, if there is a list displayed, highlight it and press **[Enter]**), the display will automatically change and update according to the numerous setup parameters defined for that channel.

*NOTE: [Chan] key behavior during a presentation depends on whether or not the **Display Channel** option is selected in the **Menu Preferences** menu. You can choose to use a scrollable list of channels when you press **[Chan]**, or you may prefer to enter the desired channel number “blind”, i.e., without on-screen feedback. See **Menu Preferences** later in this section.*

[Stby*] Standby

Press **[Stby*]** and hold for approximately 1 second to blank the display while keeping the projector in a warmed-up and ready state. Or quickly press and release **[Stby*]** and follow immediately by **[AON]** or **[VOFF]** if you want to guarantee the correct toggle (useful if you are unsure of the present status). Note that the lamp and electronics remain ON in standby mode, even though the image turns to black and most

functions are disabled. To leave standby press and hold **Stby*** again (or use **Stby*** **VOFF**). Or simply press **Exit** or **Menu**.

Menu

Press **Menu** to display the *Main* menu. A list of several options appears for access to specific functions, such as *Configuration* or *Image Settings*. Press **Menu** again to remove all menus and return to presentation level.

Enter

Press **Enter** to select a highlighted item, to toggle a checkbox (checked vs. unchecked), or to accept a parameter adjustment and return to the previous menu or image.

Exit

Press **Exit** to return to the previous level, such as the previous menu.

NOTE: **Exit** does **not** save changes within text editing boxes (including number editing of a slidebars) or within pull-down lists. It acts as a “cancel” in these cases.

Arrow Keys

The arrow keys have a variety of functions depending on the situation. Some typical uses are described below. See also *Editing Text* later in this section.

- Use **←** or **→** to change a slidebar value—hold as desired for continuous adjustment (*note the adjustment increments and range depend on the parameter being adjusted*).
- Use **←** or **→** to change to a different option within a pull-down list without having to display the list first
- Use **←** or **→** to jump between “pages”, such as in *Help* or lengthy pull-down lists.

Use the **▲ON** or **▼OFF** keys to navigate within a menu, pull-down list or text box, or to increase or decrease the value in the second (bottom) slidebar of a double slidebar.

You can also use **▲ON** or **▼OFF** in conjunction with certain *toggle* keys—i.e., those including an asterisk symbol—to ensure a toggle *only* in the desired direction. If you press **Power*** and hold it for approximately 1 second in hopes of turning the projector *on*, the projector will actually turn *off* if the projector was already on. Instead, to avoid the risk of toggling in the wrong direction, quickly press *and release normally* the function key you wish to toggle (in this case **Power***). Then immediately (within 2 seconds) press either **▲ON** or **▼OFF** as desired. The specific toggle will occur.

Toggle keys are labeled with an asterisk on the keypad. They are listed below:

- **Stby*** + **▲ON** = put the projector in standby mode
Stby* + **▼OFF** = leave standby
- **Power*** + **▲ON** = turn the projector on
Power* + **▼OFF** = turn the projector off
- **Display*** + **▲ON** = turn the menu system on
Display* + **▼OFF** = turn the menu system off

[Cont] Contrast

Press **[Cont]** to change the amount of white in your images. Use **[◀-]** and **[+▶]** until you reach the desired level of contrast—for best results, start low and increase so that whites remain bright but are not distorted or tinted, and that light areas do not become white (i.e., are “crushed”). Conversely, low contrast causes dim images. See *Image Settings*.

[Bright] Brightness

Press **[Bright]** to increase or decrease the amount of black in the image. Use **[◀-]** and **[+▶]** until you reach the desired level of contrast—for best results, start high and decrease so that dark areas do not become black (i.e., are “crushed”). Conversely, high brightness changes black to dark gray, causing washed-out images. See *Image Settings*.

[Proj] Projector

Press **[Proj]** when you want to access a specific projector within a network or if you simply need to see if the local projector is listening. The number appearing in the “Enter Number” window indicates which projector is currently listening to commands, and will match the projector number that has been defined in its *Communications* menu.

The “Projector” checkbox (read-only) shows whether or not the projector physically connected to a keypad is listening to commands from that keypad. A checkmark means that connected projector is listening; if there is no checkmark, you are communicating with a different projector.

Enter the 3-digit number assigned to the specific projector you want to use. Press **[Enter]** to select, press **[Exit]** to cancel. If you switch to a projector other than the one you are currently using, the checkmark will be deleted.

Press **[Proj]** and then **[Proj]** again *without* entering a projector number to broadcast to multiple projectors. Keypad commands will then affect all projectors present.

*NOTES: 1) The "Broadcast Keys" option in the Communications menu must be selected for only **one** (any) projector in a serial network. The keypad in use must be OFF (disabled) for the remaining projectors. See **Keypad Protocols** and **Communications** later in this section.*

[Pixel] Pixel

Press **[Pixel]** to access the pixel tracking and pixel phase double sidebar. Adjust pixel tracking first: use **[◀-]** or **[+▶]** to increase or decrease the frequency of the pixel sampling clock to correct consistency of the image. For proper phase, use **[▲ON]** and **[▼OFF]** to increase or decrease pixel phase so that any shimmer disappears and the image is stable throughout. See *Size and Position* for a complete explanation of tracking and phase.

[Position] Position

Press **[Position]** to move the image using the double sidebar. At the sidebar, use **[◀-]** or **[+▶]** to move the image left or right, use **[▲ON]** or **[▼OFF]** to move the image up or down.

Func **Function Key**

From presentation level, press **Func** followed by a 2-digit number to enable a specific color or colors in the display. For example, **Func** **6** **4** will display only red and green data, **Func** **6** **7** will display all colors data. The list of available color combinations is shown below and also appears on the back of the IR remote keypad. Color enabling can also be accessed through the menu system rather than these shortcuts.

Func **6** **1** = Red
Func **6** **2** = Green
Func **6** **3** = Blue
Func **6** **4** = Red and Green
Func **6** **5** = Green and Blue
Func **6** **6** = Red and Blue
Func **6** **7** = All colors (**Exit** does the same thing)

*NOTE: Once **Func** is pressed in presentation level, the projector will not respond to non-numeric entry until 2 digits have been entered or until 5 seconds of inactivity have elapsed.*

Use of the **Func** key within the menu system is noted with the appropriate topic elsewhere in *Section 3*. For example, press **Func** in the *Channel Setup* menu to enable deletion or copying of a channel.

OSD* **OSD* (On-screen display)**

Press and hold **OSD*** for approximately 1 second to toggle menus on or off (i.e., visible or invisible). Or press **OSD*** followed immediately by **▲ON** or **▼OFF** to guarantee the correct toggle direction (useful if you are unsure of the present status). Note that invisible menus are fully functional.

*NOTES: 1) With OSD on, you can still mute menus, error messages, slidebars, etc. with the appropriate setting in the **Preferences** menu.*

Help **Help**

Press **Help** for detailed information about any current menu and highlight. Press **Help** again to exit. From presentation level, press **Help** to access the *General Help* menu consisting of *Using Help*, *Setup*, *Keys*, *Source (Input) Selection*, and *Stat/Pwr LEDs*. Press **Exit** to leave *General Help* and return to presentation level.

Test **Test**

Press **Test** to display one of the available test patterns. Press **Test** again to display the next available pattern in the sequence. **Test** will exit after the last pattern, or press **Exit** at any time to remove the current test pattern from the screen and return to presentation level.

*NOTE: For a complete list of all test patterns, see the **Geometry** menu description later in *Section 3*.*

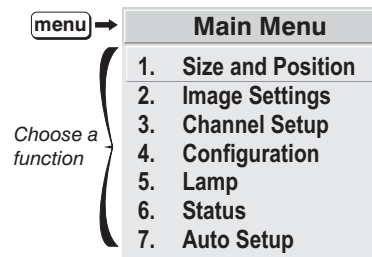
Display* **Display ***

Use **Display*** to hide the current menu. Press and hold **Display*** for approximately 1 second to toggle on or off with a single key press. Or quickly press and release

Display* and follow immediately with **AON** or **VOFF** if you want to guarantee the correct toggle (useful if you are unsure of the present status).

3.4 Navigating the Menus

Most of the controls for the projector are accessed from within the projector's menu system. The *Main Menu* is accessible by pressing the **Menu** key on the remote keypad. This menu is accessible at any time during operation. From it you can access various other "sub-menus" with related functions.



On the keypad, either enter the number corresponding to the sub-menu you wish to access, such as **2** for the *Image Settings* menu, or use the **▲** **▼** keys to highlight the desired option and press **Enter**. The sub-menu you selected will then appear.

The only menu item that does not offer a sub-menu, but activates an action is "Auto-Setup". When selected it will begin an automated process of optimizing critical display parameters such as size, position, pixel tracking, etc.

Once you have a sub-menu displayed, navigate in a similar manner—enter a menu option number for any numbered option, or use **▲** **▼** to move the highlight and press **Enter** at the desired option. Extra long menus have a scroll bar on the right—use the arrow keys to see the remainder of the menu. Items that are locked out or do not pertain to the current action appear "grayed-out" and cannot be selected.

*NOTES: 1) If there is no signal present, all source-dependent adjustments are disabled. 2) After 15 minutes of inactivity, the projector leaves the menu system and returns to the presentation. 3) The **Status** menu is read-only.*

When finished with a sub-menu, do one of the following:

- Press **Exit** to return to the previous screen
- Press **Menu** to return to the main menu, press **Menu** a second time or **Exit** to return to presentation level

On-line Help ➤ If at any time you are uncertain what to do next, press **Help** to display detailed information about the current menu or highlighted option. A scroll bar appears on the right-hand side of a help window if there is additional text—use the arrow keys to scroll. Press **Help** again to exit. At the bottom of some menus, a line of hint text also appears.

Press **Help**, from presentation level to access general *Help Topics*. Scroll as necessary within a topic. Press **Exit** to return to your presentation.

Help Topics
1. Using Help
2. Setup
3. Keys
4. Source (Input) Selection
5. Status/Power LEDs

Figure 3.2. General Help Topics

Time-outs ➤ Whenever the projector is not at presentation level, such as when there is a sidebar, menu, message or test pattern displayed, you have limited time in which to make a keypad entry before the projector returns to presentation level and the graphic disappears. These time-outs vary depending on the current display, as shown in the following chart:

TIME-OUTS	
Slidebar (from pres.)	5 seconds
Slidebar (from menu)	15 minutes
Lamp Timer Msg.	30 seconds
Channel entry	5 seconds
Other	15 minutes

The Global Icon 🌐 ➤ A menu item marked with a global icon means that any changes made to that option are global to the projector and will be applied to all incoming signals.

Using Slidebars and Other Controls ➤ Most of the sub-menus allow you to change settings by using slidebars, checkboxes, and pull-down lists. To select a sidebar, toggle a checkbox status, or view a pull-down list, do one of the following:

- Enter the menu option number corresponding to the setting you wish to change (for example, press **2** for Size in the *Size & Position* menu).

Or press **▲ON** or **▼OFF** to:

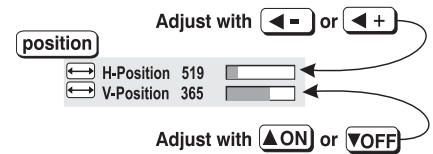
- move the highlight to the desired parameter and press **Enter**.
- move the highlight to the option desired and press **◀** or **▶**.
- Or bypass menus entirely and use a single key to immediately access an adjustment (*Note: This applies only to options having their own key, such as Position, Pixel, Bright, and Contrast*).

Once selected, change the setting as desired (see below) and press **Enter** to save and return to the current sub-menu.

SLIDEBARS IN MENUS - The current value for a given option, such as size or vertical stretch, appears to the left of its sidebar icon. This number may express a percentage or specific units (such as pixels, degrees Kelvin, etc.), depending on the option. Press **◀** or **▶** to gradually adjust the setting up or down—both the number and the length of the bar change accordingly (for continuous adjustment, hold down the desired arrow key). Or press **Enter** to activate a sidebar text box for specific number entry via the keypad, then press **◀** or **▶** and **Enter** to save (or press **Exit** to cancel).

Bright 50.0 

DOUBLE SLIDEBARS - In double sliders, such as the *Pixel Tracking / Pixel Phase* double slider, adjust the top slider with **←** or **→** as desired. When you have finished with the top slider (whether changed or not), adjust the bottom slider with **▲ON** or **▼OFF**.



When you are done, press **Exit** to return to your presentation. For fast continuous adjustments, hold down the desired arrow key.

DIRECT SLIDEBARS - For quick access, you can often use a slider (or double slider) without traveling the menu system. For example, simply press **Cont** to immediately display the same contrast slider accessed with the “Contrast” option in the *Image Settings* menu. Direct sliders are listed below.

LIST OF DIRECT SLIDEBARS	
H-Position or V-Position	Position
Pixel Tracking or Phase	Pixel
Contrast	Cont
Brightness	Bright

Use the arrow keys to adjust a direct slider, or press **Enter** and enter a specific number from the keypad, then **Enter** or **←** or **→** to save (or **Exit** to cancel). When you are done, press **Exit** to save and return to your presentation.

NOTES: 1) You can still adjust a direct slider as usual if the menu display is turned off (see **OSD*** or **Menu Preferences** menu) — the slider just won’t be visible.
2) A direct slider disappears if it is not used within 5 seconds.

CHECKBOXES - Conditions are present if its adjacent checkbox contains a checkmark. To toggle the checkbox, simply highlight and press **Enter**, or highlight and use **→** to check and **←** to uncheck. For a checkbox that is numbered, simply enter the number of the option to toggle the checkbox.

Broadcast Key ☒

PULL-DOWN LISTS – To see a pull-down list of options available for a given parameter labeled with a ▼, you can:

- Highlight it and press **Enter**
- Or enter the menu option number.

Use **▲ON** or **▼OFF** keys to navigate up and down within the list (the current choice is noted with a small ►). Press **Enter** to choose an option from the list, if desired.

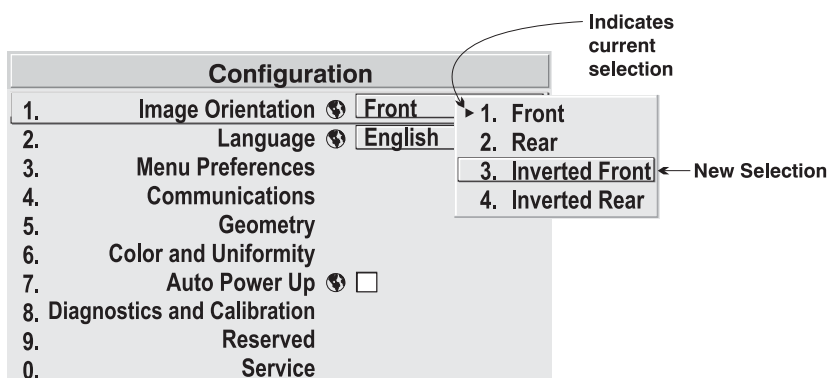


Figure 3.3. Example of Pull-Down List

Or, if you prefer to quickly scroll through a list without first pulling it down, highlight the option and use **◀** or **▶**. Press **Enter** when the desired choice appears.

NOTES: 1) Press **◀** or **▶** to jump between “pages” in an extra long pull-down list. 2) Press **Exit** while in a pull-down list to **cancel** any change.

Editing Text ➤ **ACTIVATE THE EDIT WINDOW:** To enter or edit text, highlight the desired parameter (such as a **Channel Name**) and press **Enter** to activate its adjacent edit window. Any previously entered text is displayed with its first character highlighted in a square cursor, signifying that this character is ready for editing.

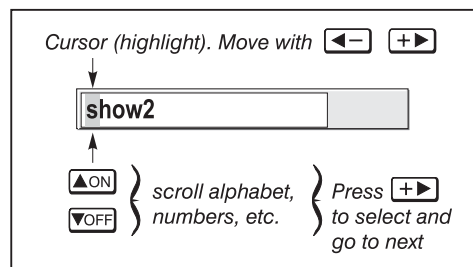
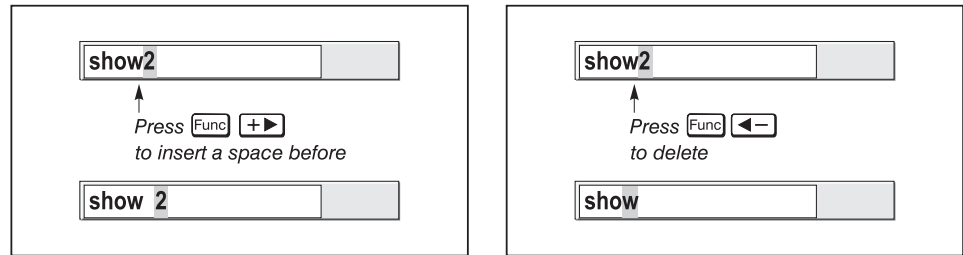


Figure 3.4. Entering Text

NAVIGATE WITHIN THE EDIT WINDOW: Press **▶** to move the cursor forward or **◀** to move the cursor backwards as desired.

EDIT A CHARACTER: To edit a highlighted character, use **▲** and **▼** to scroll through the alphabet, numbers, spaces and punctuation available. When the character you need appears, press **▶** to select it—the cursor will move to the next character of current text, if present. Note that you can also enter a number directly from the keypad—it will be accepted and the cursor will move on.

ADD OR DELETE A CHARACTER OR SPACE: To insert a space at the cursor location, press **Func** **▶**. To delete a highlighted character (or space), press **Func** **▶**.



PRESS Enter WHEN FINISHED: To accept the edits and move out of the edit window, press Enter.

NOTE: Press Exit at any time to cancel changes and return to the previously defined text.

Editing Numerical Values ➤ Enter numbers directly from the keypad in order to specify numbers representing projectors, channels (source setups), switchers, or slots. As each digit is entered, it is displayed and the cursor moves on. Note that channel numbers are defined with 2 digits—for example, if you enter only a single digit (like “7”) for a channel number, the channel will automatically be defined as “07”. Use “07” to utilize this channel.

NOTES: 1) Once you enter the first digit, this digit replaces all old digits. 2) If you press any non-numbered key, the number entered up to that point is accepted and updated as the new value. 3) Press Exit to cancel editing of numerical values.

3.5 Using Inputs and Channels

NOTE: See **Section 2, Source Setup**, for a full explanation of how to connect a variety of sources to the projector.

The projector stores and automatically recalls up to 99 different channels (source setups) for a variety of inputs. This memory feature allows you to define and conveniently use a wide variety of customized setups rather than having to repeatedly re-configure the projector for different presentations. Each physical source (i.e., *input*) can have several different channels associated with it.

Do I Select an Input Or a Channel? ➤ **INPUT** – An input simply describes a physical location for an incoming signal connection. These connections are always either on the projector itself (one of the four inputs at the rear of the projector) or on any switcher connected to the projector’s switcher port. Input describes the source signal according to two specific criteria only—to which *switcher* it is connected and to which *slot* it is connected—and is identified by a 2-digit number entered on the keypad. The first digit specifies the switcher (0-9), the second specifies the slot (1-9). Note that the projector is always considered “switcher #0”.

EXAMPLES:

Input 1 3 = use source connected to switcher #1, slot #3

Input 0 1 = use source connected to the projector, slot #1

To switch between input ports (if your projector has a switcher connected to it) press the Input key and enter the 2-digit number representing the switcher and slot location for the desired signal. (Note there is no on-screen feedback for entering the numbers.)

If it is the first time you have used the source/input (or if you used the input but did not define a channel by adjusting anything), the projector will recognize the

new input signal based on its frequencies and polarities, and will automatically display an image according to default settings for such a signal.

If you used the source once before and changed a display parameter such as contrast, V-Position etc., then a channel was automatically created and still exists in projector memory (see below). Selecting an **Input** (**Input** 0 1, **Input** 0 2, **Input** 0 3 or **Input** 0 4) will automatically recall this channel—and all its setup parameters—and update the display accordingly. *Note: If more than one channel exists for the input, the image will be displayed according to the setup parameters for the first channel with matching characteristics.*

CHANNEL - A channel is a collection of measurements, locations and settings that tailor a display to your specific needs. Since source types and applications can vary greatly, you will likely want to adjust and define a wide variety of parameters, such as brightness, contrast, size, etc., in order to customize and optimize the display coming from a particular source. For example, the display settings you choose for a VCR source may be very different from those you choose for a high resolution computer source, or one signal may simply vary from another signal used earlier through the same input location. Once you have adjusted a display parameter, such as pixel tracking or contrast, all current settings are collectively stored in the projector's memory as a unique 2-digit channel, such as 09. You can have numerous distinct channels available for the same input, any of which can be selected by using the **Chan** key on the keypad followed by the 2-digit channel number.

Channel: 01				
01	0,2	PDig	64.09k+	60.12+
02	0,1	i3LG	33.72-	59.94-
03	0,4	iSVid	15.73k-	59.94-

Figure 3.5. Channel List

NOTE: The **Chan** key may display a channel list or not, depending on what you have defined within the **Menu Preferences** menu (see **Menu Preferences** later in this section). Figure 3.5 is a sample channel list available from **Chan**.

In order to use channels (**Chan** on the keypad), you must first create them. See below.

Creating a New Channel — AUTOMATIC —

To use a new source with the projector, a new channel must be added to projector memory so that the projector will respond properly to an input signal from that source in the future. A new channel can be created automatically, as described here, or it can be copied from an existing channel and then edited as necessary (see *Copying or Deleting Channels* later in this section).

When you select an input (eg. **Input** 0 1) the existing channels in the projector are searched for matching input and signal parameters. If no match to the incoming input signal is found in the currently defined channels, a new channel is temporarily created based on factory-defined defaults for this signal. The *channel number* assigned to this channel is the lowest available number from 01-99.

NOTES: 1) An automatic channel will be discarded unless one or more of its parameters are changed, and will not appear in the **Channel List**. 2) If two channels have the same distinguishing source characteristics except for the reversal of sync connectors (i.e., H-sync and V-sync, are switched), they are still defined as distinct channels. 3) You cannot define a new channel without a signal present.

If the incoming signal *does* match an existing channel, the image will be set up and displayed as usual according to the parameters currently defined for that channel.

USING A CHANNEL: You can normally select a channel at any time by pressing **[Chan]**. If you want to prevent a channel from appearing in this list, you must edit the channel as described in *Editing a Channel Setup* later in this section. Such a channel can be selected by entering its number or by highlighting it and pressing **[Enter]**, (see Figure 3.5 above).

NOTES: 1) The current channel is highlighted upon entering the **Channel List**, or, if this channel is not displayed in the list, the first channel in the list is highlighted. 2) Channels created automatically do not appear in the **Channel List** unless a parameter has been changed.

What Channels Are Defined So Far? ➤

All available channels are listed in the *Channel Setup* menu, which describes how each channel can be accessed and which serves as the gateway for editing, copying and deleting channels.

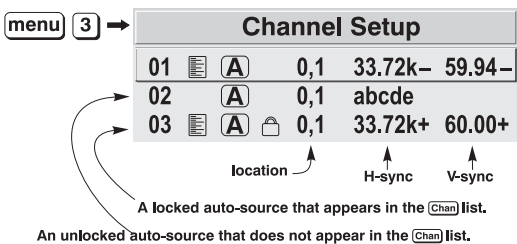


Figure 3.6. All Channels Appear in the Channel Setup Menu



From presentation level, press **[Menu]** to display the *Main* menu. To display the *Channel Setup* menu, press **[3]**, or move the highlight to the *Channel Setup* option and press **[Enter]**. The *Channel Setup* menu will appear (see Figure 3.6), with the active channel highlighted.

WHAT APPEARS IN THE CHANNEL SETUP MENU? As shown in Figure 3.6, this menu lists all channels defined so far and indicates how they are connected to the projector. The far left column contains current channel numbers defined. The values in the far right columns indicate horizontal and vertical frequencies—if a name has been defined for this channel, it appears here instead. Other columns contain details pertaining to each channel setup, such as its switcher number, slot location, a variety of icons indicating access to the channel, and an abbreviated description of each signal type. See *Editing a Channel Setup* for details.



SIGNAL TYPE — Either channel list, whether the **[Chan]** key list or the *Channel Setup* menu, identifies signal types in a shortened form as defined below. These descriptors indicate what signal information the projector used to identify a match for a given channel, and are preceded by either an “i” (interlaced signal) or “p” (progressive signal). See Table 3.1.

Table 3.1. Abbreviations for Signal Type




Abbrev.	Signal Type
4WH	Composite (4 wire) on HC input
4WV	Composite (4 wire) on V input
SG	Sync-on-green
SR	Sync-on-red
5W	Separate H,V
5WR	Separate H,V swapped
SVid	S-Vid
CVid	Composite Video
3LH	Tri-Level on HC input
3LV	Tri-Level on V input
3LG	Tri-Level on green
E3LH	European Tri-Level on HC input
E3LV	European Tri-Level on V input
E3G	European Tri-Level on green
Dig	Digital

If you have more than a handful of channels, use  and  to see the remaining channels not visible in this initial display.

To copy, delete or edit any of the channels listed in the *Channel Setup* menu, highlight the desired channel and do one of two things:

- Press  if you want to copy the selected channel or delete this or other channels. See *Copying or Deleting a Channel* below.
- Press  if you want to edit channel setups (i.e., non-image related parameters) for the selected channel. See *Editing a Channel Setup*, below.

Copying or Deleting Channels

➤ **TO COPY A CHANNEL**, highlight the desired channel in the *Channel Setup* menu, then press  to go to the *Channel Copy/Delete* submenu. Select **Copy** and press —a new channel will be created. It is identical to the original, which still remains, but it is identified with the next available number from 01-99. If you change your mind and do *not* want to copy the current channel, press  to cancel and return to the previous menu. Copying channels is a quick method for creating numerous channels, each of which can then be edited and adjusted for a variety of presentations in the future.

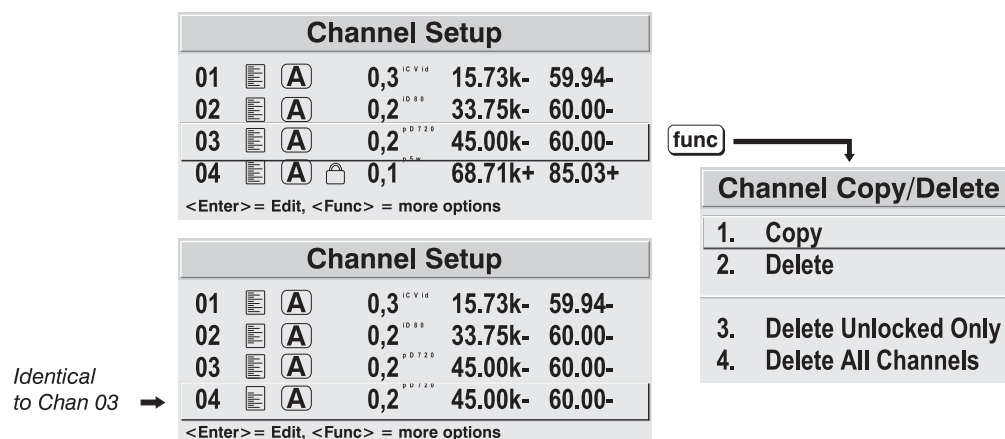


Figure 3.7. Copying A Channel

TO DELETE A CHANNEL, highlight the desired channel in the *Channel Setup* menu, then press **Enter** to activate the *Channel Copy/Delete* submenu. Select **Delete** and press **Enter**—a confirmation window will appear to make sure that you really want to delete this channel.

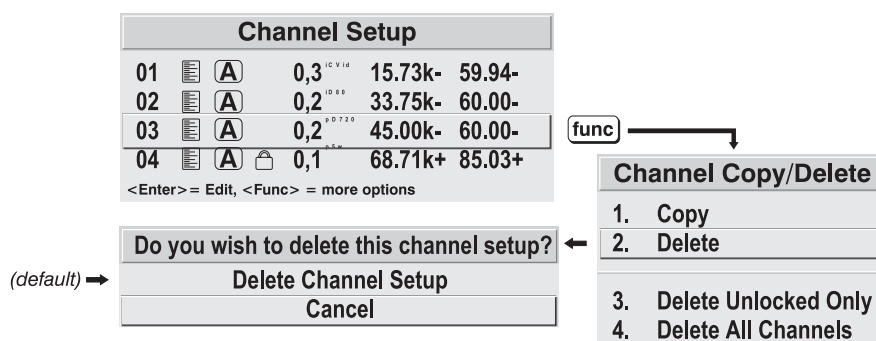


Figure 3.8. Deleting a Channel

TO DELETE MULTIPLE CHANNELS, highlight any channel in the *Channel Setup* menu and press **Func** to go to the *Channel Copy/Delete* submenu. Select **Delete Unlocked Only** and press **Enter** to delete all unlocked channels. Or select **Delete All Channels** to delete all channels, even those that are locked. In either case, the current channel will remain but will be redefined from projector defaults.

*NOTE: For any deletion, a confirmation box appears to make sure that you really want to delete. Select **Cancel** (default) if you don't want to delete after all.*

Editing a Channel Setup ➤ The basic setups that describe how and where a channel can be accessed are listed in the *Channel Setup* menu. These channel setups can be edited at any time in the *Channel Edit* submenu.

To edit a channel, do the following:

1. Display the *Main* menu (press **Menu** key). To display the *Channel Setup* menu, press **[]**, or move the highlight to the *Channel Setup* option and press **Enter**. The *Channel Setup* menu will appear.
2. To edit parameters shown in the *Channel Setup* menu, select the relevant channel and press **Enter**.

Channel Edit				
1.	Name	pres2	Sync Type	Digital
2.	Number	09	H-Sync	63.75 kHz +
3.	Switcher	0	V-Sync	60.02 Hz +
4.	Slot	1	Interlace	No
5.	In Menu	<input checked="" type="checkbox"/>		
6.	Auto Source	<input checked="" type="checkbox"/>		
7.	Locked	<input checked="" type="checkbox"/>		
8.	Previous Channel			
9.	Next Channel			

Figure 3.9. Channel Edit Menu (SAMPLE)

If desired, edit the following channel setups in the *Channel Edit* menu:

- **CHANNEL NAME:** An alpha-numeric label can be defined and/or changed here. Channel names can be up to 12 characters in length.
- **CHANNEL NUMBER:** A channel number from 01 to 99 can be changed here. *NOTE: If you enter a channel number that already exists, a dialog message appears indicating that this number is already in use—assign a different channel number.*
- **SWITCHER NUMBER:** “0” represents the projector itself. Or, if the input source is connected to a switcher, the default will be the lowest switcher number available (from 1-9)—change here as desired.
- **SLOT:** 1 (- **LOCKED:** If checked, all of the image settings for this channel are disabled. If unchecked (default), all available image settings can be adjusted as desired. You cannot use Auto Setup with a locked channel.
- **IN MENU:** If checked (default, except for automatically defined channels with unchanged parameters), this defined channel will then appear in the list available when key is pressed. If unchecked, the channel must be accessed via on the keypad or via the Auto Source function. *NOTE: On-screen display of the channel list is an option that must be set in Menu Preferences.*
- **AUTO SOURCE:** If checked, (default), the projector can automatically locate this channel when an incoming input signal matches. If not checked, the projector can locate the selected channel only when it is directly selected via on the keypad—and a change in input signal will *not* result in a channel change.
- **PREVIOUS CHANNEL:** Select this option to see or change *Channel Edit* settings for the previous channel in the *Channel Setup* list.
- **NEXT CHANNEL:** Select this option to see or change *Channel Edit* settings for the next channel in the *Channel Setup* list.

3.6

Adjusting an Image

Most options for image adjustments can be accessed through two menus: *Size and Position* (Menu 1) and *Image Settings* (Menu 2), both of which are listed in the *Main* menu. While in either of these two menus, you can change settings affecting the image from the current channel by working with the appropriate sliders, checkboxes and pull-down lists. Selecting (Exit) will always return you to the previous menu (or to the presentation, if from the *Main* menu) and accept any changes you may have made.

From your presentation, you can access any of the individual options in these menus by pressing (Menu) followed by the appropriate two-digit number representing their location in the menu system. For example, press (Menu) 2 6 to quickly access the **Color Setup** option in the *Image Settings* menu.

Note that for certain options, you may prefer to use a “direct key” from presentation level to go directly to a particular option rather than traveling through the menu system (*Note: this is not available for all display parameters*). For example, press (Cont) to access the **Contrast** sliderbar immediately. Press (Exit) to return to your presentation.

NOTE: 1) To hide the “direct” sliders only, make sure the Display Slidebars option in the Menu Preferences menu is unchecked. 2) Press and hold the (OSD) key to toggle the on-screen display OFF – this hides the entire menu system from view.*

Size and Position ➤

The *Size and Position* menu allows you to increase or decrease the size of your image, change its proportion (aspect ratio), move the image to a specific area of the screen, and refine other related parameters. Use *Size and Position* controls to match the image precisely to the screen size and aspect ratio needed for your application.

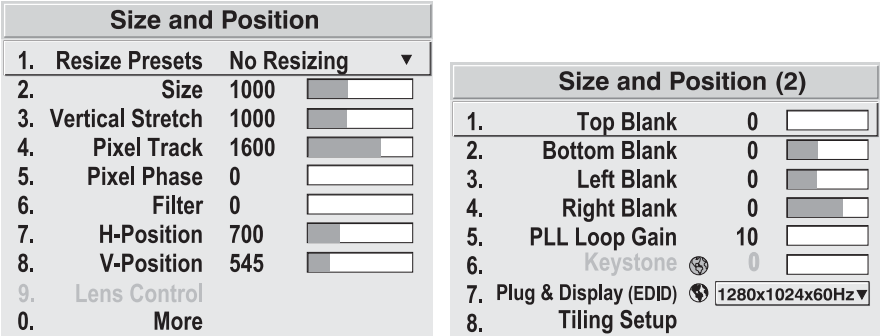


Figure 3.10. Size and Position Menu

Refer to *Using Slidebars and Other Controls* earlier in this section if you need help using any of the following slidebars or pull-down lists to alter your image. Changes made to the *Size and Position* menu are applied immediately and are saved when you exit the menu (press (Exit) or (Menu)).

NOTE: Resize Presets, Size, Vertical Stretch, Lens Control, Keystone, Plug & Display and Tiling Setup are not applicable to D100UF models. These projectors display images in their native resolution only – they have no resizing ability.

Resize Presets

Applicable only to *D100U* models - use the pull down menu to quickly display an image in its native resolution (including anamorphic) or to automatically resize an image to closely fit the screen. The value for **Size**, **Position** and **Blanking** parameters (described later) will, in turn, change as necessary without your having to set them manually.

Resize Presets	
1. Default	= maximize for current source
2. No Resizing	= display in native resolution
3. Full Size	= fill the screen (regardless of source)
4. Full Width	= display full width
5. Full Height	= display full height
6. Anamorphic	= retain 16:9 aspect ratio ("letterbox")
7. Tiled Full Size	Same as above except multiple screens used - as indicated in "Tiled Setup"
8. Tiled Full Width	
9. Tiled Full Height	
0. Tiled Anamorphic	

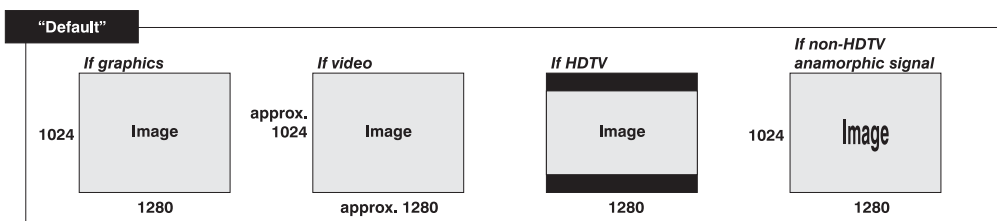
What is the projector's default? When displaying a new source, by default your image will fill the screen as fully as possible for the type of source present. See *Select Default* below.

When "custom" appears: The **Custom** descriptor automatically appears in the *Size and Position* menu when any of the values for **Size**, **Vertical Stretch**, **H-Position**, **V-Position** or **Top**, **Bottom Right** and **Left Blanking** do not correspond to those for a preset. It is not an option in the *Resize Presets* pull-down list.

SELECT DEFAULT for most images. This option will center and display your image as large as possible for the present source, as described below:

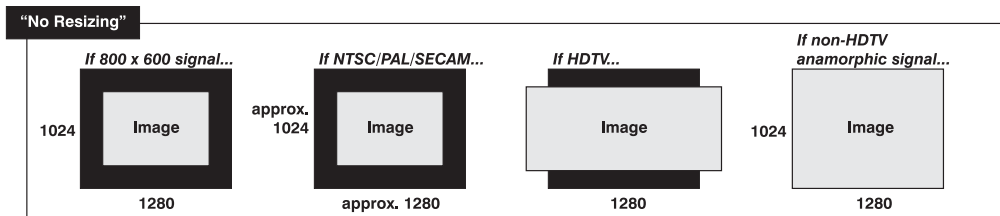
- ⇒ **A graphic image** will resize to fill the screen, regardless of its original aspect ratio. For example, 1024 x 768 becomes 1280 x 1024
- ⇒ **A video image** will resize to fill the screen while still maintaining its aspect ratio (assumed to be 5:4).
- ⇒ **An HDTV wide-screen (16:9) image** will resize to fill the screen horizontally while maintaining its 16:9 aspect ratio—i.e., there will be black borders at top and bottom, commonly called "letterboxed".
- ⇒ **A non-HDTV anamorphic (16:9) image**, typical of DVDs, will be stretched vertically.

So with the exception of HDTV (16:9), the **Default** setting produces an aspect ratio that is either almost or exactly 5:4. See examples below.

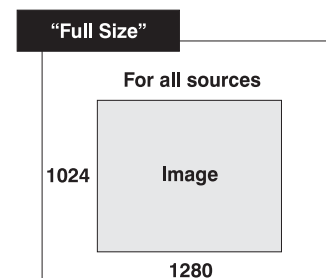


SELECT NO RESIZING to display the image in its native resolution, which may be smaller or larger than the native resolution of the projector. All **Size**, **Vertical Stretch**, **H-Position**, **V-Position** or **Blanking** values will change accordingly. For example, for a source with a native resolution of 800 x 600, **No Resizing** will center a small image within a black border. Conversely, an HDTV image is wider than both 1024 and 1280 and will be cropped on the sides—or, in the case of "1080i" HDTV, cropped at top and bottom too. With **No Resizing**, signals with non-square pixels,

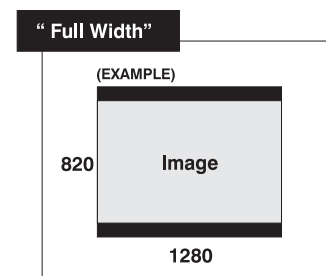
such as video connected to **INPUT 3** or **INPUT 4**, produce distorted images that are too tall or too wide. See below.



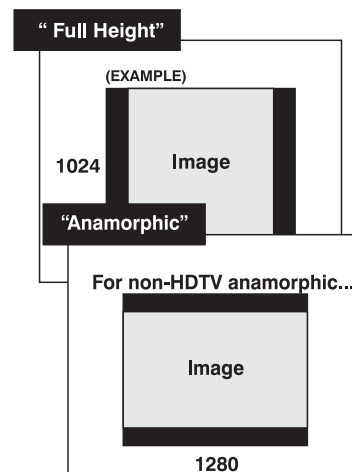
SELECT FULL SIZE to use all pixels for displaying the image, regardless of source or original aspect ratio. See right. *NOTE: SXGA resolution shown.*



SELECT FULL WIDTH to fill the screen from left-to-right for displaying the image. The top and bottom of the image may appear black (similar to a 16:9 image).



SELECT FULL HEIGHT to fill the screen from top-to-bottom for displaying the image. The left and right areas of the image may appear black.

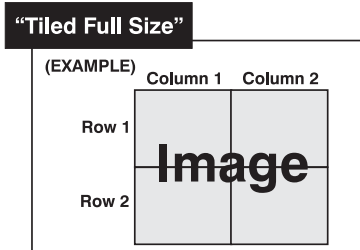


SELECT ANAMORPHIC to display an entire non-HDTV "wide screen" (anamorphic) image in its native 16:9 aspect ratio. Known as letterbox, the image will fill the screen from left-to-right, but will not use all vertical pixels available (top and bottom will be black). If you do not choose **Anamorphic** when a non-HDTV anamorphic image is present, the default image will be stretched vertically, characterized by obvious distortion and "thin people".

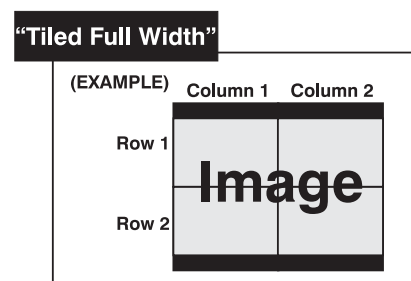
*NOTE: Use **Anamorphic** for regaining a 16:9 display of non-HDTV anamorphic sources only (typically found on some DVDs, for example). For HDTV, the **Default** setting will produce the same result.*

USING “TILED” RESIZE PRESETS – When you are working with a display wall you will want to resize the image according to the size of your wall. The last four “tiled” resize presets are for this purpose. These options are only available when a display wall has been defined in the *Tiling Setup* menu. See *Working with Multiple Projectors* later in this section for instructions on how to define your display wall.

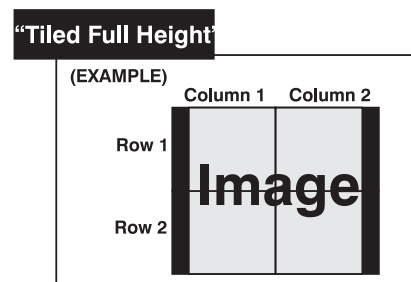
- **SELECT *TILED FULL SIZE*** to fill all screens in the defined array with the data from the incoming signal. The data will be stretched horizontally and vertically to fill all screens – this option does not maintain aspect ratio.



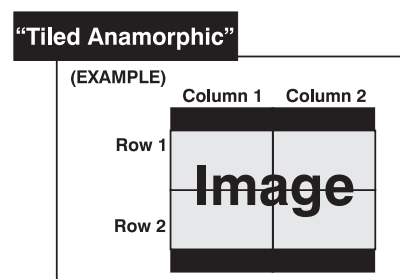
- **SELECT *TILED FULL WIDTH*** to fill all screens from left-to-right with the data from the incoming signal. The data will fill the width of the array leaving a top and bottom black border - aspect ratio maintained. Best suited for HDTV signal.



- **SELECT *TILED FULL HEIGHT*** to fill all screens from top-to-bottom with the data from the incoming signal. The data will fill the array vertically while maintaining aspect ratio – black borders will appear on the left and right of the image.



- **SELECT *TILED ANAMORPHIC*** to display a “wide-screen” (anamorphic) image in a 16:9 aspect ratio.




Size – controls both the image width and height in tandem, maintaining the current aspect ratio (proportion) of data from the incoming signal.

Vertical stretch – adjusts the height the image while keeping the width constant. Use Vertical Stretch to display data from the incoming signal in a different aspect ratio.


Pixel tracking – adjusts the frequency of the pixel sampling clock, indicated by the number of pixels per line, so that all pixels generated by a particular source are sampled. Proper pixel tracking ensures that the image quality—whether good or poor— is *consistent* across the screen, that aspect ratio is correct, and that pixel phase can be optimized (below).

Pixel tracking is adjusted most effectively using a good test pattern, such as a smooth gray consisting of a clear pattern of tiny black and white dots, or a similar “half on, half off” graphic image, such as the *Windows* shutdown screen. Steady flickering or several soft vertical stripes or bands across the entire image indicates poor pixel tracking. Adjust the slider until the stripes broaden to the point where one large stripe fills the image. Again, the image may still exhibit some noise.

*NOTE: 1) By default, the projector will sample at the correct frequency for most sources. 2) **SHORT CUT:** Press  and adjust the top sliderbar.*

Pixel phase – adjusts the phase of the pixel sampling clock relative to the incoming signal. It is used primarily for adjusting RGB inputs.

Adjust pixel phase when the image (usually from an RGB source) shows shimmer or “noise”. Pixel phase adjustment is done most effectively from within a proper test pattern, such as a smooth gray consisting of a clear pattern of tiny black and white dots, or a similar graphic image, such as the *Windows* shutdown screen. Adjust until the image is stable and each dot is clearly defined. Using the numbers on the sliderbar as a guide, you will notice that you can actually stabilize the image at more than one point—i.e., you may find that the image appearance at “11” is identical to the image appearance at “38”, thus you can select either setting.

*NOTE: 1) Adjust pixel phase **after** pixel tracking is properly set. 2) **SHORT CUT:** Press  and adjust the bottom sliderbar.*

Filter – applies a low pass filter to the input signal. This removes high frequencies, which can improve pixel phase noise, but also reduces signal bandwidth. Note that most signals will not require any filter adjustment—use the filter option only if standard pixel tracking and phase adjustments do not adequately clear up a “noisy” signal. For best results:

1. Optimize **Pixel Tracking** and jot down the value.
2. Optimize **Pixel Phase**
3. If the image is still too noisy, return to **Pixel Tracking** and “mis-adjust” so that 2 vertical bands of noise appear, separated by a good center band. See Figure 3.11.
4. Adjust **Filter** to maximize the width of the good area. See Figure 3.11.
5. Return **Pixel Tracking** to its correct setting from Step 1.
6. Readjust **Phase**.

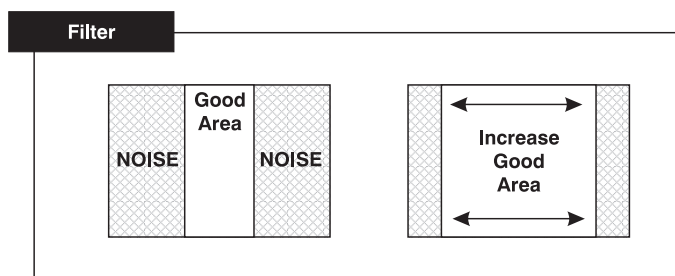


Figure 3.11. Adjust Filter

NOTE: **Filter** affects only the current signal.

H-Position – This option moves the image to the right or left.

NOTE: 1) The value shown represents where the approximate center of the image lies in relation to the total number of pixels available horizontally. This varies widely according to the signal—watch the image while adjusting. 2) **SHORT CUT:** Press **Position** and adjust the top slidebar.)

V-Position – This option moves the image up or down.

NOTE: 1) The value shown represents where the approximate center of the image lies in relation to the total number of pixels available vertically. This varies widely according to the signal—watch the image while adjusting. 2) **SHORT CUT:** Press **Position** and adjust the bottom slidebar.

Lens Control – not available in this projector.

Top, Bottom, Left or Right Blank – By adjusting these options you blank (turns to black) the top, bottom, left, or right edge of the image so that any unwanted information is cropped from view. For example, when displaying native size video you may want to blank out a few of the top lines.

PLL Loop Gain – This control changes the relative offset to the default gain. The default **PLL Loop Gain** setting of 10 is set automatically with a **Pixel Tracking** adjustment and is correct in most cases. In rare instances, such as if your image exhibits tearing or “flag-waving”, increase the **PLL loop Gain** setting as necessary. Or, if your image is unstable and “breaks up”, this may indicate that the **PLL Loop Gain** setting is either too high or too low. **PLL Loop Gain** affects the current channel only.

NOTE: PLL stands for “Phase Lock Loop”.

Keystone – not available in this projector.

Plug & Display (EDID) – By default the **Plug & Display** option detects an incoming digital flat panel video signal and displays it in the native resolution of your projector. If you have additional daisy chained projectors they too will display in this resolution. If you want to use a different resolution (for example, your graphics card may not support the current resolution), select a different **Plug & Display** setting from the list – see right.

- | |
|---------------------|
| 1. 1024x768x60Hz |
| 2. 1024x768x120Hz |
| ▶ 3. 1280x1024x60Hz |
| 4. 1280x1024x105Hz |
| 5. 1600x1200x45Hz |

NOTE: Unavailable options appear grayed out.

Tiling Setup

This submenu provides options that will help you define the size of your display wall. See 3.8 Working with Multiple Projectors later in this section for details on how to use the options in this menu.

Image Settings ➤ Use the options available in the two-page Image Setting Menu to alter your image. Options not available are grayed out and cannot be selected. Changes made to the *Image Settings* menu are applied immediately and are saved when you exit the menu (press **Exit** or **Menu**).

Image Settings				Image Settings (2)			
1.	Contrast	50.0	<div></div>	1.	Processing Mode	Auto	▼
2.	Brightness	50.0	<div></div>	2.	Motion Filter	Auto	▼
3.	Pixel Phase	0	<div></div>	3.	Dark Interval	0	<div></div>
4.	Detail	2	<div></div>	4.	Invert Stereo3D		<div></div>
5.	ColorSpace	RGB	▼	5.	White Boost	10	
6.	Color Setup			6.	PLL Loop Gain	10	
7.	Video Options			7.	Noise Reduction	0	
8.	Input Levels			8.	Horizontal Filter	0	
9.	More			9.	Vertical Filter	0	

Figure 3.12. Image Settings Menu (page 1 and 2 shown)

NOTES:1) **Detail, Color Space, Video Options, Processing Mode, Motion Filter, Noise Reduction, Horizontal Filter, Vertical Filter** are not available in D100UF projector models. 2) **Dark Interval and Invert Stereo3D** options are not available in this projector.

Contrast

(**SHORT CUT:** Press **Cont** and adjust the slidebar.)

Contrast increases or decreases the perceived difference between light and dark areas of your image (0-100). If contrast is set too high, the light parts of the image lose detail and clarity. If set too low, the light areas will not be as bright as they could be and the image will be dim. Start low and increase so that whites remain bright but are not distorted or tinted, and that light areas do not become white (i.e., are “crushed”). For best results, keep close to 50.

Brightness

(**SHORT CUT:** Press **Bright** and adjust the sidebar.)

Brightness increases or decreases the amount of black in the image (0-100). Start high and decrease so that dark areas do not become black (i.e., are “crushed”). Conversely, high brightness changes black to dark gray, causing washed-out images. For best results, keep close to 50.

Pixel Phase – Refer to description in Size and Position

(**SHORT CUT:** Press **Pixel** and adjust the bottom sidebar.)

Detail

(**SHORT CUT:** Press **Detail** and adjust the sidebar.)

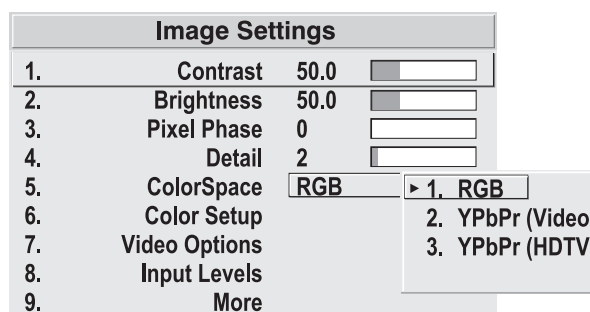
Detail adjusts the sharpness of the video image. Use **←** or **→** until the display is as sharp as possible, keeping in mind that any level of detail above 3 (default) will increase the level of detail as well as introduce some level of noise in the image. Set below 3 to filter the signal and remove noise from a noisy source. Keep at 3 to apply no detail.

Color Space

Color Space determines how the color components of an input signal are decoded for accurate color in the display. Selecting a color space option is useful only for analog signals connected to **INPUT 1** or **INPUT 2**. Although the projector determines the color space for such a signal, in some circumstances, you may wish to override this and manually set a different color space.

*NOTE: For digital signals or for signals connected to **INPUT 3** or **INPUT 4**, the color space function is entirely automatic and the pull-down list disabled.*

The current color space appears in the *Image Settings* menu. Press **Enter** to select a different option:



- Select **RGB** unless you are using component video at **INPUT 1** or **2**.
- Select **YPbPr (Video)** with a standard definition televised signal (SDTV).
- Select **YPbPr (HDTV)** with a high definition televised signal (HDTV).

NOTE: When certain RGB signals are first connected, the projector may not initially recognize them as RGB and will incorrectly decode their color information as YPbPr (video). These signals can include:

- RGB signals in NTSC, PAL, SECAM frequency ranges

- Scan-doubled sync-on-green
- Scan-quadrupled sync-on-green



For these signals, change the Color Space to RGB, which defines a new channel for future use.



Color Setup

Color Setup is a submenu of *Image Settings* that allows you to modify color saturation and hue, select a preset gamma curve or access a color temperature setup submenu.

Color Setup			
1.	Color	50.0	<input type="text"/>
2.	Tint	50.0	<input type="text"/>
3.	Select Color Temp	6500K	▼
4.	Interpolated Color	6500K	<input type="text"/>
5.	Gamma	Default	▼
6.	Color Temp Setup		

*Note: **Color**, **Tint**, and **Interpolated Color** are not available to D100UF models and appear grayed out in the menu.*

COLOR - **Color** adjusts the color saturation level or the amount of color in a video image. When set to “0” the image appears black and white and when set too high the colors appear unrealistic. Use  and  to adjust **Color** until the desired saturation level is displayed.

TINT - **Tint** adjusts color hue to obtain true color reproduction of NTSC video signals or HDTV signals. Use  and  until the desired balance or red-to-green is displayed in your image. It is best to adjust tint while displaying an external test pattern- otherwise, it is recommended that tint remain at its default setting.

SELECT COLOR TEMP - **Select Color Temp** applies either a preset color temperature (3200K, 5400K, 6500K or 9300K) or any previously “User” defined color temperature.

All temperatures are measured in degrees Kelvin and represent the “coloration” (reddish or bluish) of the whites displayed by the projector. Whites appear more reddish when a low color temperature is selected and more bluish when a higher color temperature is selected.

INTERPOLATED COLOR - Increase or decrease the value of **Interpolated Color** if you need a specific color temperature somewhere in between two preset color temperatures. For example 7841 is interpolated from 6500 and 9300.

GAMMA - *NOTE: **Gamma** does not normally require adjustment and is intended for experienced users only.*

The **Gamma** option affects the shape of the curve determining what gray shades are available for a given amount of signal input between minimum (black) and maximum (white). Different curves can improve performance for certain kinds of source input and applications. Generally the best gamma curve is one that produces maximum contrast, brightness and color performance for the current signal and ambient lighting conditions.

DEFAULT (default) – This setting provides good black levels and high contrast under optimum viewing conditions for virtually all types of images, including video, HDTV and computer graphics.

ENHANCED – This setting elevates *middle* gray levels compared to **Default**, and provides a more gradual rolled-off transition to maximum white. Together, these differences can improve the appearance of many kinds of images.

HIGH AMBIENT – This setting elevates *low* gray levels compared to the **Default** and **Enhanced** settings. In high ambient light conditions, details can be seen in the dark parts of an image that would otherwise be difficult to perceive.

PAL/SECAM – This setting results in a darker image with higher contrast. The gamma curve more closely matches the official standard for PAL and SECAM video signals.

NTSC ENHANCED – This setting is similar to **Enhanced**, but results in a darker image with higher apparent contrast.

LINEAR – This setting is a straight, linear transition from black to white. For normal source signals, it results in a picture of low contrast with highly elevated low- and mid- level grays. It should be used only with sources that have their own pre-applied gamma control.

Color Temperature Setup – The *Color Temperature Setup* submenu allows you to apply, alter, add, or copy a color temperature, or if you want to use an unaltered factory default color temperature.

By default, the projector can utilize any of four calibrated factory-set color temperatures: 3200, 5400, 6500 or 9300 (expressed in degrees Kelvin). For most applications, these temperatures will display accurate and realistic colors from a variety of sources. They can be selected at any time in either the *Image Settings* menu (4. *Color Setup*) or in the *Color Temperature Setup* menu.

Color Temperature Setup			
1.	Select Color Temp	6500K	▼
2.	Interpolated Color	6500	<input type="text"/>
3.	Red White Level	100	<input type="text"/>
4.	Green White Level	100	<input type="text"/>
5.	Blue White Level	100	<input type="text"/>
6.	Color Enable	White	▼
7.	Copy From	6500K	▼

Figure 3.13. Color Temperature Setup Menu

However, if you require extra color temperatures, you can also add up to five custom color temperatures—four **User** and one **Interpolated**—by defining them within the *Color Temperature Setup* menu (each defaults to 6500K until then). Any **User** or **Interpolated** temperature created here is immediately applied, or it can be selected at any time from the *Image Settings* menu (4. *Color Setup*) as usual, regardless of your source or channel. The *Color Temperature Setup* menu options are described below.

NOTE: For best results, use an internal grayscale test pattern when working with color temperature.

SELECT COLOR TEMP – The current color temperature is shown in the menu and can be changed here just as in the *Color Setup* menu. When a **User** color temperature is selected, the **White Level** and **Interpolated** options are disabled and can be adjusted to create your own color temperature.

INTERPOLATED COLOR – Use this option to increase or decrease the value of **Interpolated Color** if you need a specific color temperature somewhere in between two preset color temperatures. For example 7841 is interpolated from 6500 and 9300.

WHITE LEVELS – These 3 controls are adjustable only if a **User** choice is selected (in which case **User 1, 2, 3 or 4** appears at the top of the *Color Temperature Setup* menu). Their current values are shown for the active color temperature. Changing a white level here changes the drive (contrast) for that color essentially creating a new color temperature that is “warmer” or “cooler” etc. **For maximum overall brightness, always keep at least one white level at 100.** When you are satisfied with the new “User” temperature, it can be used immediately upon exit or it can be selected from either the *Color Setup* menu or the *Color Temperature Setup* menu, as usual. You can re-define a **User** color temperature at any time using the *Color Temperature Setup* menu.

COLOR ENABLE – Select which color or colors you want to see, useful while working with color temperature white levels.

COPY FROM – Use this option to replace the currently selected **User** color temperature setup with that of another. This function can be particularly useful for creating a starting point for a new **User** color or for accessing an unaltered factory default. It is disabled for all color temperatures *except User*. See Figure 3.14.

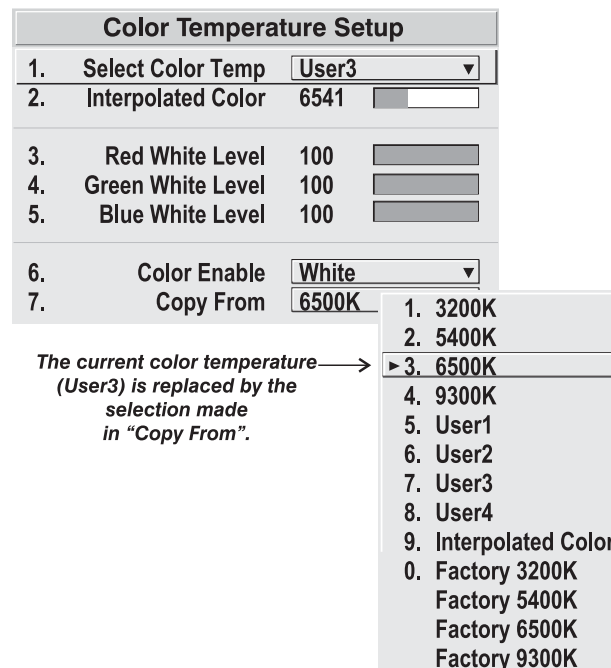


Figure 3.14. "Copy From"

How do you copy a Color Temperature?

To create a starting point: To set a starting point for a new custom user color temperature, select a user temperature, then highlight **Copy From** and select a

temperature that is similar to what you want. Adjust white levels from there as desired.

To use a factory default: The preset color temperature setups (3200K, 5400K, 6500K and 9300K) can be altered from within the password-protected *Service* menu only—note that although such an alteration changes the *setup and appearance* for a preset, it does not change its *name*. If you suspect that you are using a preset temperature that has been altered and you want instead to use the original factory-calibrated color temperature without clearing the entire projector memory, you can use the **Copy From** option in the *Color Temperature Setup* menu to set up a **User** temperature with settings from a permanent factory preset:

1. Select the User color temperature you wish to update at the top of the Color Temperature Setup menu, such as User 2.
2. From the Copy From list, select the matching temperature labeled Factory (such as “Factory 5400K”). These are the calibrated color temperatures set at manufacture—they remain intact for the life of the projector.
3. The setups for the User color temperature you selected at the top of the Color Temperature Setup menu will now be updated/replaced by those for the permanent factory calibrated temperature you selected in the Copy From list. Again, a User temperature can be altered at any time, if desired.

Video Options

VIDEO STANDARD -The projector automatically detects the video standard present and displays the name of this standard here. Press **Enter** to view or select a different video standard from a complete list available to the projector (some will appear disabled, depending on the current incoming signal). Selecting a specific standard forces the projector to process the signal according to this standard.

*NOTE: This option should remain set at **Auto** for all instances EXCEPT: 1) a poor quality input signal or 2) a black-and-white video signal. In order to detect and display such signals, select the relevant standard.*

INPUT VIDEO BLACK - This control compensates for incoming elevated black levels—called “setup”—that are present in certain video signals, and ensures that blacks on screen are neither crushed (i.e., with dark gray appearing black) nor excessively elevated (i.e., with black appearing dark gray). By default, the projector automatically determines the correct setting according to the type of incoming video signal:

- **0 IRE** – For DVD output with “enhanced black”, SECAM, most PAL standards, and Japanese NTSC
- **IRE** – For most NTSC video signals

For some types of video, you can override the setting. The control is disabled for other types of video, and also for graphics sources. Generally, if black appears crushed when **Brightness** = 50, choose **0 IRE**. If black appears excessively elevated, use **7.5 IRE**.

VCR – This control determines to what degree the projector tolerates signal disturbances. The correct setting is automatically determined and set according to the type of incoming source signal—for instance, there should be a checkmark for all VCR sources. The **VCR** option may require a change from its auto setting in very rare circumstances only, such as if you are having difficulty switching between two unusual and almost identical VGA computer sources. Otherwise, it is not necessary to change this option.

VIDEO TERMINATION - Enter a checkmark to terminate the video inputs 3 and 4 (75 Ω). The input should be terminated unless the signal loops through (continues) to another projector or display device, in which case only the last projector in the chain should be terminated.

ENABLE DECODER AGC -The AGC, “automatic gain control” affects decoded video images only. Enter a checkmark (default) for most decoded video sources—this activates the AGC circuit to ensure properly bright images. Delete the checkmark if a decoded video image exhibits strange color artifacts such as stripes in highly saturated colors, indicating an incompatibility between this source and the AGC.

DECODER LUMA DELAY - This control affects any incoming composite or S-video signal, delaying the luma signal (intensity) in relation to the chroma (color). In the image, increasing the luma delay will move luma (seen as a shadow where colors overlap) to the right slightly, with colors remaining in place. Decreasing this delay will move the shadow slightly to the left. If necessary for your current source, adjust so that no shadows occur with adjacent colors.

Input Levels

*NOTES: 1) It is recommended that only experienced users use the **Input Levels** menu—the projector automatically optimizes input levels for all but the most unusual of sources. 2) Always check that overall contrast and brightness settings are near 50 **and** that color temperature is properly set up on an internal grayscale test pattern before attempting an input level adjustment. 3) There must be at least one white pixel present in the image for proper “Auto Input Level” function. Leave this control **off**. 4) It is recommended that you turn **White Boost off** (value of 0) before adjusting Input Levels.*

Input Levels		
1. Auto Input Level		<input type="checkbox"/>
2. Red (Pr) Blacklevel	50.2	<div><div></div></div>
3. Green (Y) Blacklevel	50.2	<div><div></div></div>
4. Blue (Pb) Blacklevel	50.2	<div><div></div></div>
5. Red (Pr) Input Drive	50.2	<div><div></div></div>
6. Green (Y) Input Drive	50.2	<div><div></div></div>
7. Blue (Pb) Input Drive	50.2	<div><div></div></div>
8. Clamp Tip		<input type="checkbox"/>
9. Color Enable	White	<div></div>
0. Peak Detector		<input type="checkbox"/>

Figure 3.15. Input Levels Menu

Good RGB or input levels—that is, the *drives* and *blacklevels* for each of the three colors, red, green and blue—ensure that images from analog sources other than decoded video have maximum contrast without crushing black or white. By default (and in an **Auto Setup** from the *Main* menu), the projector automatically determines the best input levels by monitoring image content and adjusting the controls appropriately—further adjustment is typically not required to obtain proper blacks or whites. *NOTE: This automatic adjustment requires at least 1 white pixel in the image. Without a white pixel, input levels may produce skewed colors, particularly in non-video images.*

However, for a very unusual source exhibiting overly high blacklevels (most often caused by a noisy source that causes blacklevel spikes), an experienced user may

prefer to use the *Input Levels* menu (see Figure 3.15). These adjustments, which are actually a calibration process to compensate for differences in sources and cabling, enables an experienced user to perfect the source image input levels. Note that *input levels* are of limited use with digital signals, but offer some ability to tweak poorly mastered source materials.

AUTO INPUT LEVEL – Keep **Off** for virtually all sources (default). Temporarily enter a checkmark *only* if you are an experienced user and you have an unusual source that you feel needs further color temperature and/or input level adjustment. After entering a checkmark, wait for the six values to stabilize, then delete the checkmark and exit.

BLACKLEVELS AND DRIVES - To check your image and adjust these controls:

1. Make sure overall **Contrast** and **Brightness** are both set to near 50. *NOTE: Not required for Auto adjustment.*

Cont = 50 (approx.)

Bright = 50 (approx.)

2. Check the color temperature setup using an internal grayscale test pattern, adjusting as desired to obtain a neutral grayscale. *NOTE: Not required for Auto adjustment.*
3. Make sure you are using an analog source *not* connected to **INPUT 3** or **INPUT 4**, as input levels are not applicable for digital sources or sources going through the decoder. A grayscale is recommended.
4. If the blacks and/or whites appear okay, input levels do not need adjustment. If black levels are too high (and/or whites are too low, which is rare), you likely have a noisy source that is producing skewed input levels. Continue with Step 7.
5. Temporarily enable **Auto** in the *Input Levels* submenu. Wait for all 6 values to stabilize. Alternatively, do *not* use **Auto**—reduce blacklevels manually instead. Judge by eye and change one or more of the six levels as necessary to obtain proper blacks and whites. You may want to see only a certain color while adjusting—use the **Color Enable** option (described below).
6. Delete the **Auto** checkmark and leave the *Input Levels* menu.

IMPORTANT: Do not use Input Levels to adjust color temperature. This will distort Contrast and Brightness functions, as well as Color Temperature.

CLAMP TIP – This option (full name *sync tip clamping*) can brighten the image produced from certain high resolution, high frequency graphic sources. Enter a checkmark if the image appears unusually dim, if there are horizontal streaks across the image, or if there is significant color drift. Delete the checkmark if the image is either sufficiently bright or overly bright.

NOTE: The sync tip clamping option is not used for video sources or any RGB source with sync information on the video (e.g., sync-on-green).

COLOR ENABLE – Use this option to select which color or colors you want to see. This is useful while working with color temperature white levels or input levels.

NOTES: 1) Input levels apply for the current source only, but for any color temperature used. 2) Assuming that color temperature has been set up based on the internal test patterns, you can then set up input levels for a given source so that it matches the color temperature of the internal test patterns.

Input Levels		
1.	Auto Input Level	<input type="checkbox"/>
2.	Red (Pr) Blacklevel	50.2
3.	Green (Y) Blacklevel	50.2
4.	Blue (Pb) Blacklevel	50.2
5.	Red (Pr) Input Drive	50.2
6.	Green (Y) Input Drive	50.2
7.	Blue (Pb) Input Drive	50.2
8.	Clamp Tip	<input type="checkbox"/>
9.	Color Enable	White
0.	Peak Detector	<input type="checkbox"/>

1. Red
 2. Green
 3. Blue
 4. Yellow
 5. Cyan
 6. Magenta
 ▶ 7. White

PEAK DETECTOR – Enabling the **Peak Detector** option activates a special operating mode that detects only pixels that are considered black or white—all other levels are displayed as a mid-level gray. When used with a 16-step grayscale pattern, where the black and white bands are known to be at the edges of the image, you can watch these isolated areas while adjusting individual blacklevels and input drives. Images from this source will then display correct blacks and whites without crushing. See Figure 3.16.

1. Display a 16 level grayscale test pattern from the desired external source, and enter a checkmark in the **Peak Detector** checkbox. *NOTE: The **Peak Detector** will render all but the black-and-white side edges as a uniform gray field.*
2. Display one primary color (use **Color Enable** to select).
3. For the current color, adjust its corresponding **Blacklevel** sliderbar *just* until a single band of black appears at one edge of the screen. This band represents the first band of the grayscale pattern, which should be 100% black. Do not adjust too far.
4. With the same color still active, adjust its corresponding **Input Drive** sliderbar *just* until a single band of white appears at the opposite edge of the screen. This band represents the last band of the grayscale pattern, which should be 100% white. Do not adjust too far.
5. Go back and check the black band—adjust the blacklevel sliderbar if necessary. Adjustments are related, so you may have to go back and forth until both bands are *just* optimized.
6. Repeat Steps 2-5 with the other two remaining primary colors. When each primary color shows *one* optimized black band and white band, the input levels for this source are correctly set. Upon exiting the *Input Levels* menu, the **Peak Detector** checkbox will clear.

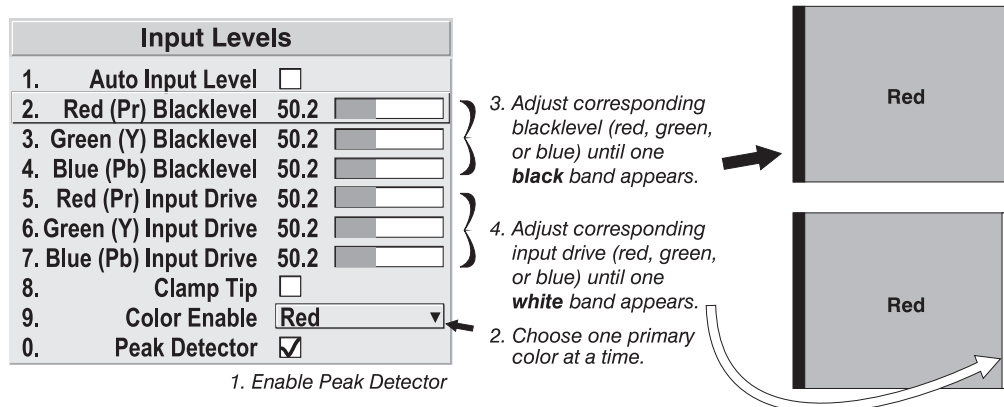


Figure 3.16. Adjusting Blacklevels by Enabling Peak Detector

Processing Mode

Found on the second half of the *Image Settings* menu this control determines the projector's processing route for the incoming signal.

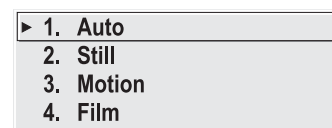
- **AUTO** (default): The projector will automatically select the correct processing mode according to what input signal it detects. Use **Auto** unless you want or need to override its performance and apply a specific mode instead.
- **VIDEO**: Performs 15 kHz NTSC/PAL video de-interlacing, regardless of signal type. Note that this option utilizes 8-bit processing.
- **GRAPHICS / HDTV**: Performs basic de-interlacing and scaling, regardless of signal type. Note that this option utilizes 8-bit processing.
- **MINIMUM DELAY**: Single option enabled for *D100UF* projector models only.
- **ADVANCED 10-BIT (ADP)**: Uses 10-bit processing instead of the standard 8-bit processing provided in the projector, resulting in smoother and clearer details in video images. This feature requires installation of optional internal hardware—the *Advanced Digital Processing Module*—and is disabled unless this module is present. It provides full source-to-screen 10-bit processing for a digital video source, typically connected via the optional *Serial Digital Input Module* or the *Digital HDTV Input Module (INPUT 2)*. Images from analog signals (**INPUT 1, 3 or 4**) will also be noticeably improved, however these signals are first converted with 8-bit processing before routing through the ADP module.



Motion Filter

This control is most useful for smoothing out moving images from interlaced sources. In most cases the proper Motion Filter setting is automatically determined according to the type of incoming source signal.

However, if your source is noisy and/or inconsistent you may wish to “force” a setting to ensure stable processing for this source—if desired, override the default “Auto” setting by selecting the appropriate motion filter.



- **AUTO**: The projector will automatically use the correct motion filter according to the incoming signal. Note that the **Still** filter will be applied for RGB *non*-HDTV

interlaced signals, and the **Motion** filter will be applied for RGB HDTV interlaced sources.

- **STILL:** For static images with no motion, such as graphics from a CD. *Note: Applied for RGB **non**-HDTV interlaced signals.*
- **FILM:** For video images that originated from film. This will optimize image quality and stability.

NOTES: 1) For 60 Hz video standards: NTSC, NTSC 4.4, PAL M, PAL 60. 2) Also recommended for PAL, PAL N, and SECAM video standard if the ADP module is present—note that you must select film mode manually in this case. 3) Signals can be from RGB video, composite video or S-video sources.

Dark Interval – Not available.

Invert Stereo3D – Not available.

White Boost - This option allows you to recapture some of the lost light from the transition between segments in the color wheel when it is spinning. Use the slider to increase the value of **White Boost** from 0 to 10. When set to a value of “0” the option is turned off. As you increase the value, you will notice the image becomes slightly brighter and a little less saturated.

NOTES: 1) It is recommended that you turn White Boost off (value of 0) when adjusting Auto Setup, and Auto Input Levels for new sources. Also, keep White Boost off when you are adjusting primary colors using an external test pattern. 2) For NTSC, HDTV, PAL and SECAM signals the default is set to “2” and for graphic signals the default is “10”. 3) White Boost is disabled when Brightness Uniformity is “in use”(checked) and when an internal test pattern is displayed – the option appears grayed out in the menu.

PLL Loop Gain – see description under **Size and Position** menu descriptions.

Noise Reduction – requires optional ADP Module

Select the amount of image noise reduction desired, with “0” applying no noise reduction (default) and “10” applying maximum noise reduction. The higher the value, the softer the image will appear. *Not available in D100UF projector models.*

Horizontal Filter – requires optional ADP Module

Select the amount of horizontal filtering desired for the current source. Note that the default setting of “0” allows the projector to optimize the amount of horizontal filtering according to the current source, and is the recommended setting for most situations. You can override this by selecting a value from 1-10, with “1” applying no filtering and “10” applying maximum filtering. High filtering levels will soften the image slightly, particularly evident along vertical edges.

Vertical Filter - requires optional ADP Module

Select the amount of vertical filtering desired for the current source. Note that the default setting of “0” allows the projector to optimize the amount of vertical filtering according to the current source, and is the recommended setting for most situations. You can override this by selecting a value from 1-10, with “1” applying no filtering and “10” applying maximum filtering. High filtering levels will soften the image slightly, particularly evident along horizontal edges.

3.7 System Configuration

Use the options in the *Configuration* menu to change system parameters to suit your preferences, run diagnostics and access the *Service* Menu. These options should only be modified by experienced users and technicians and typically don't require modification when switching sources.

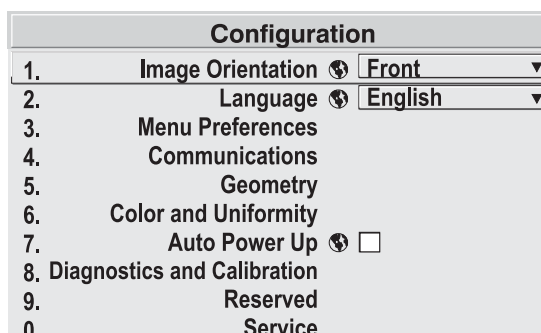


Figure 3.17. Configuration Menu

Image Orientation - Use this pull down list to change the orientation of the image to suit the installation. For example, if the projector is being used in a rear-screen application with a first-surface optical mirror, the image must be inverted and flipped – select **Inverted Rear**.

The other orientations available are: **Front**, **Rear**, and **Inverted Front**.

Language - You can select which language you want to view the menus in. The options are **English**, **French**, **Spanish**, **German** and **Italian**. The menus will change immediately upon selection.

Menu Preferences

Menu Preferences is a sub-menu that provides options to adjust the way on-screen menus are viewed in presentation level. Changes made in this sub-menu will be viewed immediately.

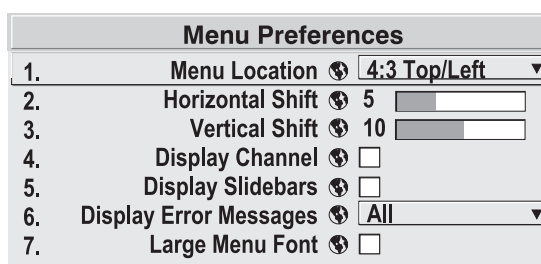



Figure 3.18. Menu Preferences Menu

MENU LOCATION – Use the pull down list to choose a default location for the display of on-screen menus. 7 preset and 1 custom locations are available.

To create a custom menu location, choose a preset that is closest to the desired area. Then adjust the slidebars of *Horizontal Shift* and *Vertical Shift* to move the menu to the desired location. Menus may differ in size and therefore it is recommended that you do not choose a location too close to a corner or edge to prevent cropping larger menus.

HORIZONTAL SHIFT AND MENU SHIFT – Adjust the slidebars to move the menu to a desired location. Used when defining a **custom** menu location.

- DISPLAY CHANNEL** – Enter a checkmark to display a list of channels that are available. These channels must be marked with a list icon  in the *Channel Setup* menu to appear in the **Display Channel** list.
- DISPLAY SLIDEBARS** – Enter a checkmark to display a sidebar over the current image when an adjustable parameter is selected directly with a key. These “direct” slidebars include, **Pixel**, **Position**, **Cont**, **Bright**. If “Display Slidebars” is unchecked these slidebars can still be accessed, but will be hidden during adjustment.
- DISPLAY ERROR MESSAGES** – Use this pull down list to select the way you want to view error messages generated by the projector. Select **Screen** or **All** to see a brief on-screen messages or select **RS232** to be see messages via RS232 and RS-422 serial communication only. To disable error message display, select **Off**.
- LARGE MENU FONT** – Enter a checkmark in the **Large Menu Font** checkbox to enlarge menu character size. *Note: On-screen menus will be larger and may require you to change the **Menu Location** to accommodate.*

Geometry

Use this sub-menu to change keystone, select a test pattern or to access the *Tiling Setup* menu.

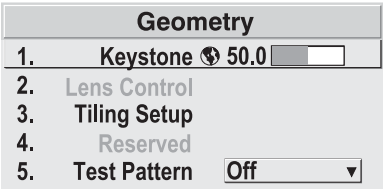


Figure 3.19. Geometry Menu

- KEYSTONE and TILING SETUP** – Refer to *Size and Position* earlier in this section for a description of these options.
- LENS CONTROL** – This option is not supported by all models and will appear grayed out in these instances.
- TEST PATTERN** – Use the pull down list to select and immediately display one of the available internal test patterns. When OFF is selected, no test pattern displays.

- 1. Off
2. Checker
3. Gray16
4. Gray256
5. White
6. Gray
7. Black
8. Convergence
9. 13 Point
0. Color Bars
- Geometry

Color and Uniformity

Select *Color and Uniformity* to access sub-menus *Color Temperature*, *Adjust Primary Colors (CSC)* or *Brightness Uniformity*.

Color and Uniformity	
1.	Color Temp Setup
2.	Adjust Primary Colors
3.	Brightness Uniformity
4.	Reserved

Figure 3.20. Color and Uniformity Menu

COLOR TEMP SETUP – Refer to *Color Temperature Setup* description under *Image Settings*.

ADJUST PRIMARY COLORS - Select this sub-menu to access options that will assist you in adjusting primary colors and intensity. This is particularly important in multiple screen installations where the color and intensity of one screen must precisely match all other adjacent screens to create a seamless image.

Primary color adjustments affect all sources and can be applied or disabled at any time by entering or deleting a checkmark at the top of the *Adjust Primary Colors* menu (*Primary Color Enable*).

Refer to **3.12 Using Multiple Projectors – Matching Colors of Multiple Projectors** later in this section for a complete, step-by step procedure.

Adjust Primary Colors (CSC)	
1.	Primary Color Enable <input type="checkbox"/>
2.	Red Primary
	Green Primary
3.	Blue Primary
4.	Select Color Temp 6500K
5.	Red White Level 69.7
	Green White Level 78.3
6.	Blue White Level 100
7.	Lamp
Use primary colors or defaults. Primary colors uses default gamma.	

Figure 3.21. Adjust Primary Colors (CSC) Menu

BRIGHTNESS UNIFORMITY - This menu allows you to **Enable Uniformity**, and access **Test Pattern**, **White Uniformity**, **Color Temp Setup** and **Lamp** options.

Enter a checkmark beside **Enable Uniformity** to enable various options to control and smooth out overall color and brightness of an image – useful in multi-screen applications. Adjust the options in this menu only after you have adjusted the primary color in the *Adjust Primary Colors* menu.

Refer to **Adjusting Brightness Uniformity** later in this section. *NOTE: Brightness Uniformity is not available when White Boost is enabled.*

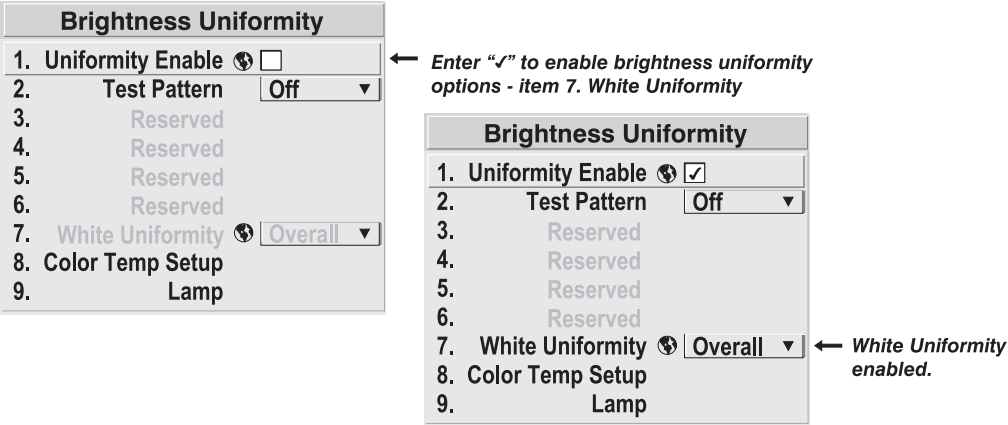


Figure 3.22. Enabling Brightness Uniformity

TEST PATTERNS – Use this option to select a variety of test patterns. Select the **13 Point** test pattern when adjusting *Brightness Uniformity*.

WHITE UNIFORMITY - *White Uniformity* is a submenu accessible only when the Uniformity Enable checkbox is checked. The options here allow you to match light output across multiple screens, which is extremely important in display walls. This enhances the appearance of a seamless image.

White Uniformity		
1.	Left Side	0.0
2.	Right Side	0.0
3.	Top Edge	0.0
4.	Bottom Edge	0.0
5.	Top Left Corner	0.0
6.	Top Right Corner	0.0
7.	Bottom Left Corner	0.0
8.	Bottom Right Corner	0.0
9.	Overall	50.0

Each option in this menu represents an area of the screen – edge or corner. By adjusting the slidebar for each option you can control the light output in these areas. See *Adjusting Brightness Uniformity* later in this section for complete instructions on how to adjust *White Uniformity* in a display wall.

COLOR TEMP SETUP – refer to description under *Image Settings*.

LAMP – When you select this option it will take you to the *Lamp* menu, also accessible from the *Main* menu. Refer to *The Lamp Menu* later in this section for complete details.

Auto Power Up

Enter a check mark to enable the projector to automatically power up after losing power to unplugging or a power failure. Note that unsaved display adjustments may be lost.

Diagnostics and Calibration

From the *Diagnostics and Calibration* menu you can access options useful in calibration and setup of an image. You can access test patterns, enable various colors, freeze an image for inspection and access the *Odd Pixel Adjustment* menu.

Diagnostics and Calibration		
1.	Test Pattern	Geometry ▾
2.	Freeze Image	<input type="checkbox"/>
3.	Color Enable	White ▾
4.	Odd Pixel Adjustment	
5.	Sync Noise Margin	<input type="text"/>
6.	Digital Noise Margin	<input type="text"/>

Figure 3.23. Diagnostics and Calibration menu

TEST PATTERN – refer to description under *Configuration*.

COLOR ENABLE – refer to description under *Image Settings*.

FREEZE IMAGE – Enter a check mark to freeze the currently displayed image. Remove the checkmark to return back to normal.

ODD PIXEL ADJUSTMENT – This menu is used when Color Space is set to RGB only. NOTE: Enabled for Xe models only.

When using certain RGB sources with still images, you may need to adjust the normal gain or offset of odd pixels in relation to even pixels.

This will smooth out very narrow

(1-pixel wide) checks or vertical stripes. You can remove these patterns as follows:

Odd Pixel Adjustment		
1.	Red Odd Pixel Offset	128 <input type="text"/>
2.	Green Odd Pixel Offset	145 <input type="text"/>
3.	Blue Odd Pixel Offset	128 <input type="text"/>
4.	Red Odd Pixel Gain	128 <input type="text"/>
5.	Green Odd Pixel Gain	116 <input type="text"/>
6.	Blue Odd Pixel Gain	128 <input type="text"/>
7.	Color Enable	White ▾

} Adjust
"Offset"
first.

} Then
"Gain"

- 1) Use an external grayscale test pattern with both dark and light gray areas.
- 2) Display the image in its native resolution – select **No Resizing** by accessing *Resize Preset* in the *Size and Position* menu.
- 3) Display a single color – select a color from the **Color Enable** pull down list or use the **Func** key options described on the back of the keypad.
- 4) Examine an area of darkest gray (but not black). If there is a 1-pixel wide pattern present, adjust the **odd pixel offset** for the current color. Stop when the pattern disappears and the area is smooth.
- 5) Examine an area of lightest gray (not white). If there is a 1-pixel wide pattern present, adjust **odd pixel gain** for the current color. Stop when the pattern disappears and the area is smooth.
- 6) Repeat for each color, adjusting offset then gain for each.

NOTES: 1) Adjust offset before gain since offset affects gain. 2) A value of 128 represents no change in normal odd pixel offset or gain. 3) Odd Pixel Adjustment eliminates "1 pixel on, 1 pixel off" patterns, not any type of larger patterns.

SYNC NOISE MARGIN – Enabled for D100UF models only, this option allows you to set how sensitive the V & HC sync inputs are to noise. A higher value will allow noisier sources to be locked onto properly and a lower value will allow locking to more heavily attenuated signals. Adjust sync noise margin using the slidebar.

DIGITAL NOISE MARGIN – Enabled for *D100UF* models only, this option allows you to set how sensitive the digital inputs are to noise, cable lengths and slight incompatibilities between the transmitter and receiver. Adjust the sidebar for the best image possible.

Service

This is a password-protected menu intended for use by qualified technicians. When accessed, passwords can be enabled or disabled, access to **User Lockout, Color Temperature, Lamp Counter, Color Wheel Calibration** and **Factory Defaults** options can be accessed and modified.

Refer to the Service Manual for complete details on the various options available in this menu.


Service	
1.	Enable Password  <input checked="" type="checkbox"/>
2.	Change Password
3.	User Lockouts
4.	Color Temp Setup
5.	Reset Lamp Counter
6.	Shutdown If Fan Fails  <input checked="" type="checkbox"/>
7.	Color Wheel Calibration
8.	Reserved
9.	Reserved
0.	Factory Default

Figure 3.24. Service Menu

3.8

System Communications

Use the checkboxes and pull-down lists in the *Communications* menu to alter the methods or types of communication to and from the projector. Refer to *Using Slidebars and Other Controls* subsection if you need help. *NOTE: Changes made to the Communications menu will be saved when you exit the menu.*







Communications	
1.	Baud Rate  115200 ▼
2.	Front IR  A or B ▼
3.	Reserved
4.	Wired Keypad  A or B ▼
5.	Broadcast Key  <input type="checkbox"/>
6.	Projector  0000
7.	Split Network  <input type="checkbox"/>

Figure 3.25. Communications Menu

BAUD RATE – The **Baud Rate** setting determines the speed of communication to and from the projector. By default, the projector baud rate is set to **19200**. Setting the correct speed is important when you are controlling the projector with an external device such as a computer or another projector via an RS-232 or RS-422 port. You must set the projector baud rate at these ports to match the baud rate of the controlling device. If you are unsure about what baud rate to choose, refer to the documentation for the controlling device. In an existing network, if you discover that a projector has the wrong baud rate, make sure to use the pull-down list and select the correct baud rate with the **Enter** key—do not just scroll this control with **←** and **→** keys.

*NOTE: 1) The baud rate setting does not affect the switcher port, which is always 9600 baud. 2) See **Serial Port Connections** and **Appendix D** for more information about cable connections between devices.*

FRONT IR - As described in Section 2, the standard IR remote keypad is capable of sending data to the projector in either one of two protocols called A or B. Likewise, the front IR sensor on the projector can be set to accept IR data accordingly, responding to **A**, **B** or **Both**. The projector's **A**, **B** or **Default** is adequate for most single-projector installations. Select a specific protocol to prevent interference when you are controlling two projectors in the same area and want to work with one projector at a time.

IMPORTANT

Keep at "A OR B" unless you are sure of the current IR keypad protocol.

*NOTES: 1) The IR remote keypad for this projector is set at manufacture to "Protocol A". See **Keypad Protocols** for information about changing the keypad protocol. 2) A key press from a conflicting protocol will cause a single yellow flash on the Status LED located in the lower right corner of the rear projector panel.*

WIRED KEYPAD - Like the IR remote keypad, the optional wired keypad is either a "Protocol A" keypad (default) or a "Protocol B" keypad. Likewise, the projector can be set to accept wired keypad data accordingly, responding to **A** or **B**. If desired, you can prohibit the projector from responding to a particular wired keypad protocol, or you can ensure that the projector responds to either protocol (default). You can also prevent the projector from responding to the keypad entirely. In the pull-down list, select the desired protocol.

*NOTE: The wired keypad for this projector is set at manufacture to "Protocol A". See **Keypad Protocols** for information about changing the keypad protocol.*

ADDING A PROTOCOL: To add a protocol, select the **A or B** option.

CHANGING A PROTOCOL: As a safeguard, you cannot accidentally select an option in the "Wired Keypad" list that would disable the wired keypad during use, since such options are automatically disabled in the list. In other words, you cannot switch to the opposite protocol or select **OFF** using the wired keypad. Instead, if you want to quickly change to the other protocol, you may find it more convenient to use the IR remote to execute the protocol change for the wired keypad. The projector will now recognize only the opposing wired keypad protocol. Or, if you prefer, use the wired keypad to safely change its own protocol:

1. Select the **A or B** option. This will ensure that once your keypad is manually changed (see Step 2), it will still be recognized by the projector.
2. Unplug the keypad and change the protocol in the keypad as desired. Do this either by hard-wiring the keypad as described in 2.10, *Keypad Protocols and Conversion*.
3. Plug the keypad back into the projector. Return to the *Communications* menu and select the new protocol you have just set up in the wired keypad.

TURNING OFF THE WIRED KEYPAD: If you want to disable the wired keypad entirely, you cannot use it to select the **OFF** option. This safeguard prevents you from

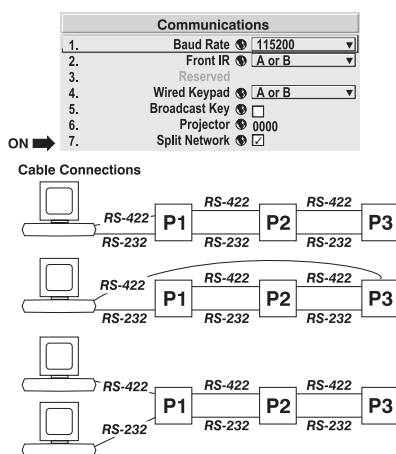
accidentally disabling the wired keypad during use. Use the IR remote keypad to select **OFF**. The projector will no longer respond to the wired keypad.

BROADCAST KEY - Enter a checkmark if you want keypad commands sent to one projector to be relayed to all projectors in a network. Note the **[Proj]** key will temporarily *override* the effect of a broadcast setting and allow you to control a specific projector when necessary. Make sure to remove the checkmark if using the split network feature.

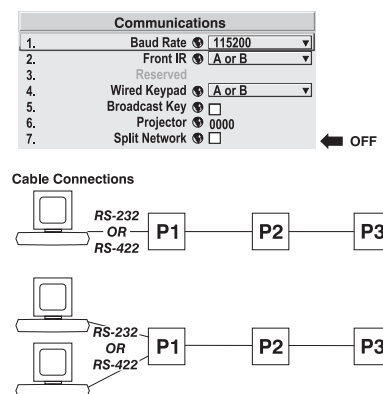
PROJECTOR - Enter a three-digit number (such as "001") to assign or change a number to the projector currently in use—if the current projector already has a number assigned, that number will appear here. Numerical identity for projectors is required whenever you want to communicate with a single projector within a multiple-projector application (see **[Proj]** key description in 3.8, Using the Keypad). If you make a mistake in assigning or changing the projector number, press **[Exit]** to cancel. For complete information about controlling multiple projectors, see *Using Multiple Projectors*.

SPLIT NETWORK - Enter a checkmark if you have a network in which each projector is connected via both its RS-232 and RS-422 serial ports (**Figure 3.26** - Option A). At each projector, serial communications will then remain on either its RS-232 or RS-422 path (depending on the controller) rather than being broadcast to all 3 remaining serial ports. Should a projector or path ever fail, the other path will be available as a back-up.

The Split Network feature is unnecessary when only a single serial link is connected between any two projectors (**Figure 3.26** – Option B), and will cause communication errors if these single links vary from RS-232 to RS-422 anywhere in the network. Likewise, if you have two serial links connected between any two projectors, failure to use the Split Network checkbox can also cause a communication error.



Option A – Split Network ON



NOTE: Required for downloading new projector software to a network.

Option B – Split Network OFF

Figure 3.26.

NOTES: 1) Requires double serial links—RS-232 and RS-422—between all projectors in a network. 2) Set each projector's Broadcast Key OFF. 3) Keypads cannot broadcast in a split network—use controller(s) instead. 4) Do not use a split network when downloading new projector software to a network.

3.9 System Status

This read-only menu lists a variety of details about the standard and optional components currently in use on the projector. Refer to the *Status* menu for versions of hardware (left side) and software (right side) installed, the number of lamp hours logged in total and for a specific period (such as a rental period), and for your projector model name and serial number. In addition, the *Status* menu identifies the current channel, switcher, slot and frequencies.

Use **AON**, **VOFF**, **←** or **→** to see additional *Status* information.

Status		
Model	RPMS	D100U 0.76:1
S/N	11111111	Software v2.3
Lamp #1 Hours	0	Lamp Counter 8
Lamp #2 Hours	0	Lamp Operation Single, Lamp #1
Projector Hours	0	Native Resolution 1280x1024
Chan Name		
Chan Num	02	Sync Type
Switcher	0(projector)	Sync 0.00KHz - i0.00Hz-
Slot	2 (Input 2)	Sample Rate 0.00MHz
IPM	6.3	Software v2.3
DVI Output Mod.		Boot 1.4
Proj Head Mod.		

3.10 Auto Setup

Auto Setup (item 7 in *Main* menu) enables the projector to quickly set up the image for you. A separate message window appears and requests confirmation that you want to continue with Auto Setup, in which case display parameters listed in the Table below will be set for you. Selecting **Auto Setup** can save you some time in setting up an image, and you can also make further adjustments as desired. You must have an unlocked channel present to use this option.

What an "Auto Setup" Does	
OPTIMIZES:	SETS TO DEFAULT:
Pixel Tracking	Contrast & Brightness
Pixel Phase	Auto Input Level (off)
Size	Blanking
Vertical Stretch	Detail (if video source)
Position	Filter
Input Levels (if analog source)	Luma Delay

3.11 The Lamp Menu

The *Lamp* menu is accessible from the *Main* menu (item 5). It is comprised of read only information, options and sub menus. From the lamp menu, you can:

- select a lamp operation and lamp power mode
- set a lamp limit and enable a lamp warning message
- select a lamp submenu to access lamp specific, read-only information, such as lamp status, record lamp serial number (required when replacing a lamp), and switch lamp operations

Lamp	
1.	Lamp Message <input checked="" type="checkbox"/>
2.	Lamp Limit 10 000
3.	Lamp Mode Power
4.	Power 100
5.	Reserved
6.	Lamp Operation Single, Lamp 1
7.	Lamp Conditioning <input type="checkbox"/>
8.	More, Lamp 1
9.	More, Lamp 2

LAMP MESSAGE - Enter a checkmark to enable a warning message to appear, upon powering up the projector, which indicates the lamp has reached the user-specified *Lamp Limit*. Delete the checkmark if you do not wish to see this warning. In this case, the status of the lamp and the number of hours it has been in use must be monitored manually.

*NOTES: 1) It is recommended that the Lamp Message checkbox remain enabled. 2) Press **Exit** to temporarily cancel the warning message. The message continues to appear upon power-up until you install a new lamp.*

LAMP LIMIT – Enter the number of hours you expect to log on the current lamp before replacing it.

NOTES: 1) If you change modes over the life of a lamp, the lamp limit you originally expected may no longer be possible. 2) Turning the lamp on and off can reduce lamp life significantly, as will other factors.

LAMP MODE - Use the pull down list to select the *Lamp Mode* (power level) of the projector. This option gives you the ability to control the light output of the projector. Although there are some exceptions, typically the life span of the lamp is shortened the higher you set the light output or power setting of the projector.

1. Max Brightness
2. Power

- **Max Brightness:** Select this option when you want the lamp to always burn as brightly as possible. The **Power** option (slidebar) in the *Lamp* menu will read as 120W in Single or Dual Lamp mode. Keep in mind that the maximum brightness for any lamp gradually diminishes with age and the image becomes dimmer over time.
- **Power:** Select this option to set the amount of power (in watts) supplied to the lamps (single or both). The power level remains constant throughout the life of the lamp.

POWER – Use the **Power** slidebar (Figure 3.27.) to set the power level (in watts) that will be applied to each of the lamps during operation. **Power** can be set at 100W – 120W for each of the lamps. When you are operating in Single Lamp mode, power is increased or decreased incrementally for the selected lamp. In Dual Lamp mode, power changes for alternating lamps (also in increments) until the desired power

level is reached for both lamps. The power level you select will remain constant throughout operation. In general, dimmer images are produced when power levels are low.

Specifying the maximum power level (120W) in this mode is the same as operating in **Max Brightness** mode.

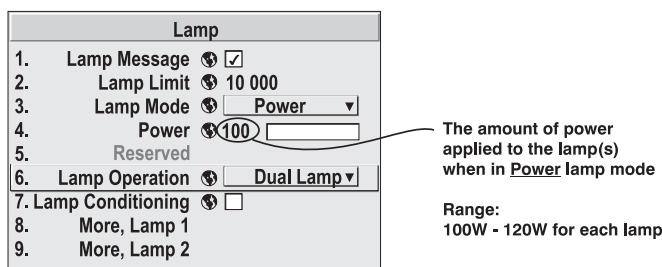


Figure 3.27.

LAMP OPERATION - One of the key features of the projector is that it can be operated with one or two lamps on. From the pull down list, select the lamp operation mode you want to operate the projector in. **Single, Lamp #1** is the default.

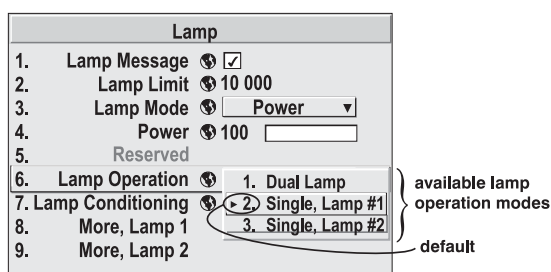


Figure 3.28.

- **Dual Lamp** – Select this option to operate the projector with both lamps on. In this mode, you can achieve maximum brightness output by the projector. If *one* lamp fails in this mode, the projector automatically switches to the single lamp mode of operation for the lamp that is still operational. This transition in lamp operation modes does not interrupt the current presentation, but creates an immediate dimming of the image. If *both* lamps fail at the same time, an error is reported and the projector automatically turns off.
- **Single, Lamp #1** or **Single, Lamp #2** – Select either one of these options if you want to operate the projector with only one lamp on and the other lamp in “reserve”. If a lamp fails in this mode, the projector automatically responds by switching to the other single lamp mode of operation. In this case, continuous operation is maintained. When you access the *Lamp* menu, the **Lamp Operation** option reads that of the new lamp.

NOTES: 1) The projector is set for lamp operation *Single, Lamp #1*, by default. 2) The projector automatically shuts down if it detects that both lamps have “failed” (this includes lamp not installed). 3) Once the “failed” lamp is replaced, the lamp operation mode does not automatically change back to the previous mode. It must manually be selected. 4) It takes several seconds for a lamp to reach full brightness when it is first turned on.

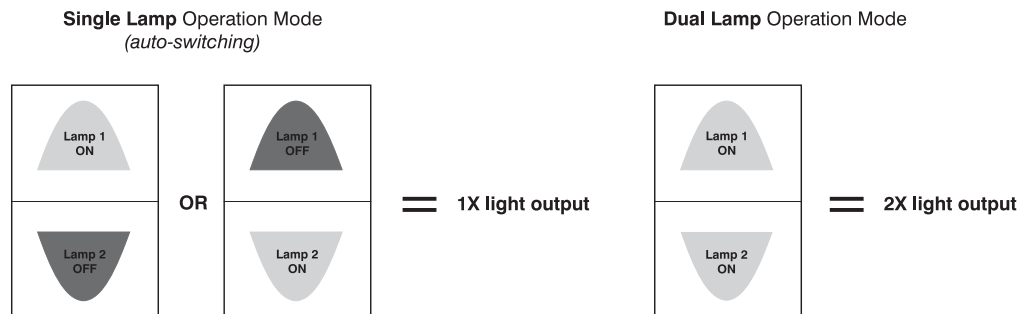


Figure 3.29. Relation between Lamp Operation Modes and Brightness

A Note About Switching Lamp Operation Modes

The projector is designed with two lamps so that it can potentially maintain constant light on the wall. It automatically detects a failed lamp and responds by switching lamp operation modes and turns the other lamp on. You may see a brief period of no light on the wall until the new lamp is ignited and a gradual increase to full brightness.

When you manually select a new lamp operation, the lamp turns off only after the new lamp has successfully been turned on. On rare occasions, a lamp will not strike on the first attempt. The projector, in this instance, has been designed to attempt a re-strike of the lamp. With the current lamp still on, the projector waits 30 seconds before initiating another lamp strike. During this time, on-screen messages will appear and an amber LED will flash every second until the lamp is successfully turned on. The projector attempts to re-strike a lamp up to 3 times after the initial change in lamp operation modes. With the 30-second wait period in between each attempt, the projector may seem like it is not responding for up to a total of two minutes. You can press any key during this time to cancel and return to the original lamp operation mode. If you cancel the operation or the attempts to strike the lamp have failed, the lamp is declared, “failed to strike” and the projector remains in the original mode.

The same occurs if you are attempting to switch from Single to Dual lamp mode; the projector reverts to the single lamp mode for the lamp that is working.

LAMP CONDITIONING - Enable this option to reduce the noticeable flicker effects that are sometimes generated by the lamp. Although this option is not typically required during normal operation, enabling it will pulse-modulate the lamp, reducing the flicker effects seen in the image. It may take minutes or hours for this option to reach full effectiveness. By default, this option is OFF.

More, Lamp 1 or More, Lamp 2 –There are two separate lamp submenus that can be accessed from the *Lamp* menu. Each submenu is dedicated to one lamp – you can view specific lamp information, such as lamp hours, lamp history and the current status of the lamp. You can also record a new serial number for a new lamp and change lamp operation modes. (Figure 3.30.)

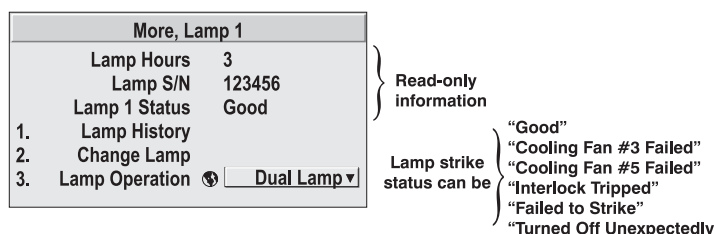


Figure 3.30.

LAMP HOURS – This read-only information indicates the number of hours logged on the current lamp. Whenever you record a new lamp serial number, this value automatically resets to “0”, where it begins to log time for the new lamp. *NOTE: You can also check Lamp Hours in the Status menu.*

LAMP S/N – This read-only information displays the serial number recorded for the current lamp. When you install a new lamp and enter its serial number (9-digits), the number will appear here in the *Lamp* menu.

LAMP 1 (OR 2) STATUS – This read-only information displays the current status of the lamp (1 or 2). An extremely valuable piece of information for troubleshooting, the **Lamp Status** can be any one of the six following states: “Good”, “Cooling Fan #3 Failed”, “Cooling Fan #5 Failed”, “Interlock Tripped”, “Failed to Strike” and “Turned Off Unexpectedly”. You can view the status of a lamp anytime during operation by accessing its submenu.

LAMP 1 (OR 2) HISTORY - Select this numbered item to access a smaller dialog box with read-only information about the history previous lamps installed and recorded. The serial number and number of hours logged for each lamp is displayed. The Lamp History is automatically updated whenever the serial number for a new lamp is recorded. The information for the new lamp is added to the bottom of the list.

Lamp 1 History	
S/N	Hours
1234	1999
5679	23

NOTE: If you remove lamps from the projector it is important to replace them back into the compartment from which they were removed. This ensures accurate lamp information is maintained. Each lamp compartment is labeled *Lamp 1* and *Lamp 2*.

CHANGE LAMP – Select this option to record a serial number of up to 9 digits/characters for every newly installed lamp. When selected, a **Lamp S/N** window appears. Use the number text entry keys to record the new lamp serial number and press **Enter** again to accept the change. See *Using Slidebars and Other Controls* if you need help entering the number. Once entered, the new lamp serial number will be added to the **Lamp History** menu and the **Lamp Hours** timer will reset to “0”. **Lamp Mode** and **Lamp Limit** remain as they were for the previous lamp, and can be changed at any time.



NOTE: 1) Enter a serial number **only** if you have just installed a new lamp. This will help ensure the lamp timer is not reset on an old lamp and that the number of hours logged on the lamp will be accurate. 2) Lamp serial number can be found on the lamp itself.

IMPORTANT

Always record the serial number of a NEW lamp.

LAMP OPERATION – This option is the same as in the *Lamp* menu. It appears again in the submenu for convenience.

3.12 Using Multiple Projectors

When working with multiple projectors, you may want to use the RS-232 or RS-422 serial ports to chain the projectors together in a network that you control from either a keypad or a computer/controller (see 2.9, *Serial Port Connections*). Or you may prefer that each projector stand alone, in which case you will probably use a single IR remote keypad. In either case, you can switch back and forth between broadcasting to all projectors or controlling each projector individually.

Assigning a "Projector#"

➤ Make sure you have assigned a unique projector number to each projector present — this number will be required in order get the exclusive attention of an individual projector. To assign a projector number:

Press **[Menu]** and select the *Communications* menu. In the *Communications* menu, scroll down to "Projector#" and enter a three-digit number (000 to 999) for identifying the current projector. Press **[Enter]** to accept the entry, or **[Exit]** to cancel.

Repeat for each projector, using a unique three-digit number for each. Once every projector has its own number, you can begin to control the network.

Controlling One Projector

➤ First make certain that only one (any) networked projector has its "Broadcast Keys" option selected (checked) and IR sensors enabled — the remaining projectors must have the "Broadcast Keys" option unchecked and their keypads disabled (do this in *Preferences* menu). The "Broadcast Keys" projector will then relay keypad commands to the other projectors. If using a wired remote, make sure to select the "Broadcast Keys" option for the projector to which the wired remote is connected.

To work with a single projector, press **[Proj]** to display an editable window from each projector. Enter the three-digit number you have assigned to the projector you wish to control. All keypad commands will then affect this projector exclusively until you press **[Proj]** again and enter a different number, or until you switch to broadcast mode (below).

NOTES: 1) If you are using a computer or controller to issue commands, use the correct RS-232 software command to gain control of a single projector.

Broadcasting to All Projectors

[Proj] [Proj]

➤ First make certain that only one (any) networked projector has its "Broadcast Key" option selected (checked) — the remaining projectors must have the option unchecked and their keypads disabled (do this in the *Configuration – Communications* menu). The "Broadcast Key" projector will then relay keypad commands to the others. If using a wired remote, make sure to select the "Broadcast Key" option for the projector to which the wired remote is connected.

On either the IR remote or wired keypad, press **[Proj]** to display the projector box. Press **[Proj]** again *without* entering a number — the keypad commands will now affect all projectors.

NOTE: 1) If you are using a computer or controller to issue commands, use the correct RS-232 software command to broadcast.

Defining a Display Wall ► Tiling Setup

Enabled for *D100U* models only, the *Tiling Setup* menu allows you to define the size of your display wall and identify the location of each projector within.

Tiling Setup	
1. Number of Rows	2
2. Number of Columns	2
3. Projector row	2
4. Projector Column	1
5. Resize Presets	Default

NUMBER OF ROWS – Set the number of rows in a display wall by adjusting the sliderbar.
Range: 1 to 4

NUMBER OF COLUMNS – Set the number of columns in your display wall.
Range: 1 to 4

PROJECTOR ROW AND PROJECTOR COLUMN – Define the location of a projector within a display wall by adjusting these two sliderbars. See Figure 3.31.

NOTE: If you are operating a single, stand-alone projector or display cube the value of Number of Rows, Columns and Projector Row and Column should be set to 1.

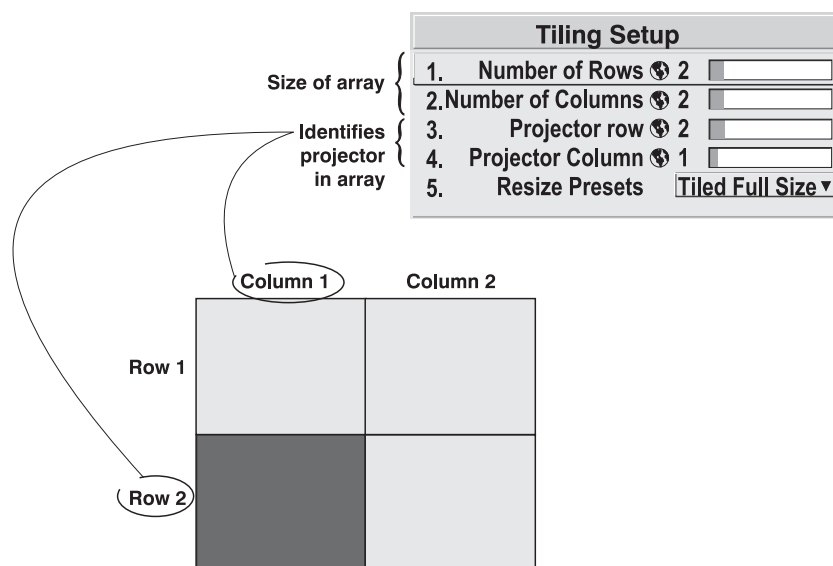


Figure 3.31. Tiling Setup (Example of 2x2 array)

Matching Colors of Multiple Projectors ►

The main objective when setting up a display wall is to try and precisely match image color and brightness from screen to screen so the wall appears seamless. To achieve this, adjustment of the various options in the *Adjust Primary Colors (CSC)* and *Brightness Uniformity* menus is required.

To match screens in a multiple display wall, do the following:

NOTES: 1) Set all projectors to the same lamp power level and lamp operation mode before you adjust primary colors and brightness uniformity. 2) Look only at the center of the screen when performing this procedure. 3) A color meter may be used but is not required to successfully perform this procedure. 4) Refer to the on-line hints for additional guidance during adjustment. 5) Color matches are optimized for graphic sources. If using video sources with over-adjusted primary colors, you may

notice a slight posterized or banded effect in images. **6)** It is recommended that you look at your primary colors again after installing a new lamp or if there is a change in the lamp operation mode (this occurs automatically if a lamp fails during operation).

Step 1: Preliminary Setup

1a) Set up and optimize all projector settings – It's not important to set up color temperature at this point. It is however, important to try and get all other projector settings as close to perfection as possible. Also make sure the edges of adjacent screens are close to one another.

1b) Assign projector ID numbers – Make sure each projector is assigned a unique 3-digit number. This will give you the freedom to switch between communicating to one projector (**[Proj]###**) or all projectors (**[Proj] [Proj]**).

1c) Display a 100% internal white field test pattern on each screen.

It is strongly recommended that you select the internal 100% white field test pattern when adjusting primary colors. **Important:** If you choose to use an externally generated 100% white field test pattern, set **Contrast** and **Brightness** to 50 for each projector and turn the **White Boost** off (set to a value of 0). Then, in the Input Levels menu, set input levels correctly for each projector while displaying an external 256-step grayscale.

1. Enter a checkmark for the Auto Input Level option.
2. Wait for the 6 values (blacklevels and drives) to stabilize.
3. Delete the checkmark and leave the Input Levels menu. Input levels are now correct for the source. Switch to the external white field for the remainder of this procedure.

NOTE: Avoid using a digital source (particularly YUV) for the white field.

1d) Set all projectors to the same lamp power and lamp operation mode.

It is recommended that you begin with a lamp power of 100W for each projector and set all projectors to the same lamp operation mode you intend to operate them in before you continue with adjustments. *NOTE: You can change the lamp power setting later. Do not try to match perceived light output at this point.*

STEP 2: Establish Starting Point for Color Adjustment

2a) ENABLE PRIMARY COLOR ADJUSTMENT. In the *Adjust Primary Colors (CSC)* menu, enter a checkmark in the Use Primary Color Enable checkbox so that primary color controls can be adjusted and applied to the image.

If at any time you decide not to use or apply the Adjust Primary Colors (CSC) feature, delete the checkmark – this disables Red, Green and Blue Primary controls (and they will appear grayed out in the menu).

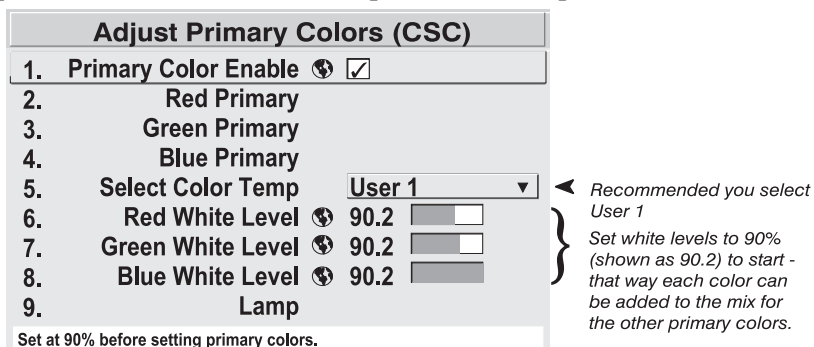
Adjust Primary Colors (CSC)	
1.	Primary Color Enable <input checked="" type="checkbox"/>
2.	Red Primary
3.	Green Primary
4.	Blue Primary
5.	Select Color Temp 6500K
6.	Red White Level 69.7
7.	Green White Level 78.3
8.	Blue White Level 100
9.	Lamp

Use primary colors or defaults.

← Entering a checkmark in the Primary Color Enable checkbox activates primary color controls and sets future default color temp. to "User 1".

Figure 3.32. Enabling Primary Color Adjustment

- 2b) SELECT A “USER” COLOR TEMPERATURE (“USER 1” RECOMMENDED)** (Figure 3.33.) In the *Adjust Primary Colors (CSC)* menu, select a “User” color temperature that you will be defining through your adjustment of primary colors on each projector. Choose any of the four User choices, but note that User 1 is the default color temperature applied if you add a new source in the future while Primary Color Adjustment is activated (instead of the usual default of 6500K applied when Primary Color Adjustment is not enabled). As in any color temperature menu, white levels for preset color temperatures cannot be changed.

**Figure 3.33. Select User 1 and set White Levels to 90%**

- 2c) SET WHITE LEVELS TO 90%** – In the *Adjust Primary Color* menu, set all White Levels to 90%. Note: A starting point should not be 100% because this color could not be added to the mix for either of the two remaining primary colors, therefore limiting the success for matching colors.
- 2d) MATCH ALL LIGHT OUTPUT OF INDIVIDUAL PROJECTORS** – Compare all white fields and choose the brightest. Using the **[Proj] ###** function to talk to the other projectors individually, increase lamp power settings as necessary until each projector has approximately the same light output as the brightest.

STEP 3: Primary Color Adjustment

- 3a) SELECT GREEN PRIMARY SUBMENU** – In the *Adjust Primary Color* menu select the **Green Primary** option. The *Green Primary* menu will appear and your screens will turn to a full green field.
- 3b) MATCH GREEN LIGHT OUTPUT.** Compare green fields and choose the dimmest. For each remaining projector reduce the **Green White Level** as necessary until all green light output appears to match.
- 3c) MATCH GREENS** – compare green fields and choose the least saturated green (the green you feel is the furthest from a true green). In the *Green Primary* menu for each remaining projector – starting with the adjacent projector – add red or blue as necessary until all green fields match the first, both in color and light output. In some cases, all projectors will need some color and in other cases only red or blue may be required. *NOTE: Green affects the light output of any color the most, blue the least.*
- 3d) ADJUST NEXT PRIMARY IN ALL PROJECTORS** – When all greens match, select **Next Primary** from the *Green Primary* menu. The *Blue Primary* menu will appear and your screens will turn to a full blue field. Repeat steps 3b) & 3c) for blue and then red. For each primary adjustment, add other “secondary” colors as necessary.
- 3e) RECHECK ALL COLORS AND ADJUST IF NECESSARY.**

3f) ADJUST WHITES – Exit the main *Adjust Primary Colors (CSC)* menu to view all white fields once more. If necessary, adjust white levels to match all white fields. All screens should now be color matched. For each projector, the settings define your chosen User color temperature. For best results, set all projectors to the same lamp **Power** (100W recommended) – light output from each will be maintained over time to within 10% of the current level. Then proceed to the *Achieving Brightness Uniformity* procedure provided below.

Applying the Primary Color Adjustments for New Sources

For any new sources that you may use, keep in mind the following:

- “User 1” is the default color temperature for all sources as long as the **Primary Color Enable** checkbox is checked in the *Adjust Primary Colors (CSC)* menu.
- **6500K** is the default color temperature if you adjusted primary colors for User 2, 3, 4 regardless of the status of **Primary Color Enable**. To switch to your primary color adjustments, select the proper User color temperature as usual from any color temperature menu. Make sure that the **Primary Color Enable** checkbox is checked.
- **6500K** is the default color temperature if the **Primary Color Enable** checkbox is unchecked regardless of which User color temperature you chose in Step 6.

Canceling a Primary Color Adjustment

To disable all primary color adjustments delete the checkmark in the **Primary Color Enable** checkbox. This will disable Red, Green and Blue Primary controls and re-enable the Gamma control.

Achieving Brightness Uniformity

- As described earlier in this section, by adjusting brightness uniformity you are attempting to create a seamless image in which the appearance of red, green and blue are the same. Also no one area of the screen appears any brighter than another. Achieving this smooth overall appearance is important in stand-alone projectors, but ever so important in display walls.

To adjust brightness uniformity, do the following:

NOTE: The procedure assumes you are adjusting a multi-screen display.



Before you begin

Read through the entire procedure before starting and keep in mind the following checklist of prerequisites and guidelines.

- ◇ **USE PRIMARY COLORS FIRST**
- ◇ **SELECT LAMP POWER**
- ◇ **USE USER 1 COLOR TEMPERATURE**
- ◇ **IGNORE THE COLOR OF MENUS**
- ◇ **USE WHITE UNIFORMITY SLIDEBARS**
- ◇ **JUDGE BY EYE OR USE A METER**
- ◇ **WHITE BOOST IS OFF WHEN BRIGHTNESS UNIFORMITY IS ENABLED**

STEP 1: General Setup

- 1a) Adjust primary colors (see *Matching Colors in Multiple Screens*). This ensures matched overall color temperatures and light output between screens.

**IMPORTANT**

Double-check that all WHITES and LIGHT OUTPUT are well matched.

See Step 3f of Matching Colors in Multiple Screens procedure. Use a color meter if necessary.

- 1b) Enable *Brightness Uniformity* by entering a checkmark in the checkbox. This enables access to the uniformity controls and applies the settings to your image.

Brightness Uniformity	
1. Uniformity Enable	<input type="checkbox"/>
2. Test Pattern	Off
3. Reserved	
4. Reserved	
5. Reserved	
6. Reserved	
7. White Uniformity	Overall
8. Color Temp Setup	
9. Lamp	

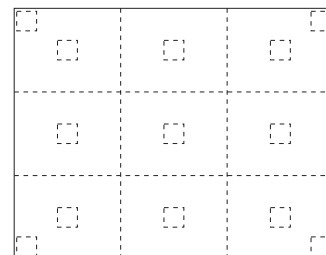
← Enter “✓” to enable brightness uniformity options - item 7. White Uniformity

Brightness Uniformity	
1. Uniformity Enable	<input checked="" type="checkbox"/>
2. Test Pattern	Off
3. Reserved	
4. Reserved	
5. Reserved	
6. Reserved	
7. White Uniformity	Overall
8. Color Temp Setup	
9. Lamp	

- 1c) Select the 13 Point test pattern for display. This pattern provides 9 screen “zones” with 13 targets. **For best results**, look at the extreme top/bottom, left/right edges of the image instead of the center.

- 1d) Select User 1 in the *Color Setup* window (accessed through *Image Settings*).

- ◇ *If you have adjusted User 1 primary colors* to create a closely-matched wall, continue to Step 2a).
- ◇ *If you prefer maximum brightness* rather than a particular color temperature set the User 1 white levels to 100 (maximum).

**IMPORTANT**

Never change color temperature white levels in color-matched applications!

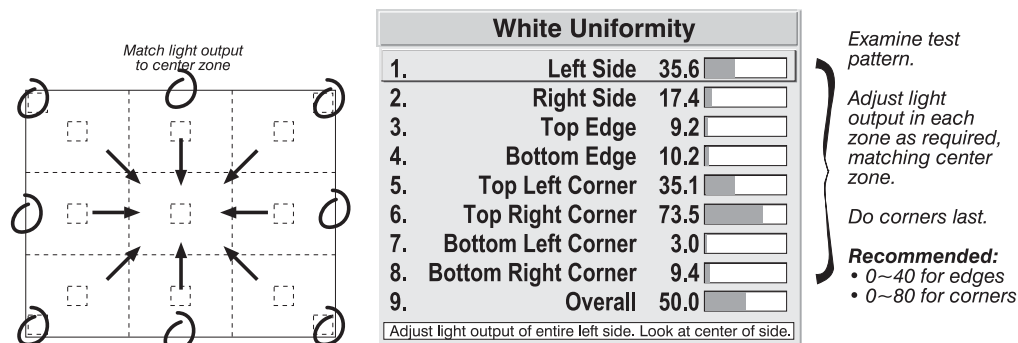
Step 2: Adjust Light Output in 8 Zones

- 2a) For each screen, compare the light output of each edge and corner to that of the center. If any of the areas differ, use the White Uniformity menu to match edges and corners to the center as described below. Begin with the screen exhibiting the most obvious variations in light output.

- ◇ Adjust edge *White Uniformity* first – note that each edge adjustment also affects the rest of the screen slightly. Keep all edges just slightly lower than the center light output rather than matching light output precisely. Otherwise, it may not be possible to brighten the corners (typically the dimmest areas of

the screen) enough. In the *White Uniformity* menu **Overall** should be set to 50.0 or less. Do not exceed 50.0 – a higher level will interfere with achieving brightness uniformity and is not recommended.

- ◇ Adjust corner *White Uniformity* last – each corner adjustment affects only this quadrant.
- ◇ Repeat for each screen.



Canceling Brightness Uniformity

If you do not want to use or apply Brightness Uniformity settings, delete the checkmark from the **Uniformity Enable** checkbox at the top of the *Brightness Uniformity* menu.

3.13 Error Conditions

Occasionally the projector may encounter an error condition that interrupts normal operation. These can be caused by invalid user entry, an input signal error (most common) or some other system error.

If you would like to be notified on-screen of such errors, select the **Screen** option from the **Display Error Messages** pull-down list (in *Menu Preferences* menu). If you would like to be notified via a serial communication only, select the **RS-232** option instead. To receive both notifications, select **All**. To disable error messages (except for invalid user entries), select **Off**.

User Errors ➤ Invalid User Entry

Any keypad entry not recognized by the projector will trigger an on-screen error message describing the problem. For example, if you specify a channel number that has not been defined, the message "Invalid Channel" will appear. Or if you try to enter the wrong password, you'll see "Invalid Password". Press **Enter** or **Exit** to confirm the message and eliminate the message box.

NOTE: Displaying of "Invalid User Entry" messages cannot be disabled, even if **Display Error Messages** has been set to **Off**.

Input Signal Errors ➤ Input signal errors messages appear when you are in presentation level (i.e., when there are no menus present) and have selected an input on which the projector detects a problem. While menus remain operational and pressing any key will temporarily remove the message from the screen, you must resolve the signal problem in order to permanently eliminate the message.

NOTE: Input signal messages appear on-screen only if **Display Error Messages** has been set to **Screen** or **All**.

No Signal

The message "*No signal*" appears when there is no signal detected at the selected input. Both HSYNC and VSYNC are inactive and the screen background is black. Connect or correct the signal, or select another input.

Bad Sync

The message "*Bad Sync*" is displayed when HSYNC or VSYNC are active but the signal cannot be displayed. Such a condition occurs when only one of the two signals is present, or when either signal is unstable or of the wrong frequency. Correct the signal or select another input.

Other Signal Error Messages

In addition to the common "*Bad Sync*" and "*No Signal*" errors, you may encounter a signal error message indicating that HSync and/or VSync are either too fast or too slow. When such a message appears, check the frequencies shown in the *Status* menu. If they are correct, then the signal is not recognized by the projector. On some PCs you may be able to change the settings to generate a compatible signal. If the frequencies shown in the *Status* menu are incorrect, check the cabling to see where the problem is.

System Warnings / Errors ➤ When the projector encounters a system malfunction, either a System Warning message or a System Error message may appear. Both types of messages are accompanied by a steady red "Power" LED and a flashing red-and-yellow error code on the "Status" LED. This condition indicates the need for service by a qualified service technician.

*NOTE: System messages appear on-screen only if **Display Error Messages** has been set to **Screen** or **All**.*

System Warnings

A system warning message indicates that a system malfunction has been detected (see *Status LED Codes*, below). It replaces any input signal message and disappears when the input signal status changes. While the projector will remain operational, the message indicates the presence of a serious problem that should be reported to the manufacturer. You can press **Exit** to remove the message, but for best results you should reset the projector—power the projector down and up again with the **Power*** key.

System Errors

A system error message indicates that a serious malfunction has been detected and must be reported to the manufacturer (see *Status LED Codes*, below). The projector will no longer operate and must be reset—power the projector down and up again with the **Power*** key.

Status LED Codes

If the "Status" LED on the back of the projector repeatedly flashes a pattern of yellow and red light while the "Power" LED glows a continuous red, you have encountered a likely system error requiring the attention of a qualified service technician (see *System Warnings* and *System Errors*, above). Try resetting the projector by powering it off and on again, cooling when necessary. Consult Table 3.2. System Error Codes and contact your dealer if the problem persists.

The specific pattern of flashing indicates the 2-digit code identifying the type of problem encountered—the number of yellow flashes represents the first digit and the number of red flashes indicates the second digit. For example, a pattern of “yellow-yellow-red-red-red” is “Code 23”, meaning the lamp ballast (power supply) is overheated. These codes are listed in Table 3.2.

Table 3.2. System Error Codes

Code	Description
GENERAL	
12	Software bug. Contact dealer/factory.
13	CRC error in flash ROM. Download new software.
14	Replace IPM
15	Attempting to download code without being in boot mode
16	Invalid interrupt. Power off/on. If it persists, contact dealer/factory.
LAMP FAILURES	
21	Unable to turn the lamp on
22	Lamp driver communications failure (while in dual lamp mode)
23	Lamp ballast (power supply) is overheated
24	Lamp 1 Fault: lamp interlock switch open or color wheel stopped
25	Lamp may be on before being turned on
26	Both lamps failed
27	Unexpected lamp shut-off
29	Lamp 2 Fault: lamp interlock switch open or color wheel stopped
IMAGE PROCESSOR MODULE	
31	Boot code CRC failed
32	Unable to program the Sync Xilinx part
33	Unable to program a device on Altera programming bus
34	Unable to program a device on JTAG programming bus
35	Unrecognized ROM type
36	Write to flash ROM failed
37	General IPM failure
38	Code being downloaded will not fit in ROMs
LIGHT ENGINE ELECTRONICS	
49	Color wheel stopped
POWER & COOLING	
51	Fan #1 failed
52	Fan #2 failed
53	Fan #3 failed
55	Low voltage power supply failed to turn on
56	Lamp shutdown due to fan failure
59	Fan #5 failed
PROJECTION HEAD MODULE (PHM)	
71	Unable to access EEPROM on the PHM
72	EEPROM memory has re-initialized
VIDEO DECODER MODULE (INPUT 3 OR 4)	
81	Unable to program the video decoder (VDM)
OPTIONAL INTERFACE MODULE	
91	Unable to program the option card
92	10-bit ADP boot failure

If you encounter a system error, try resetting the projector by powering it off and on again (allow proper cooling if necessary). Contact dealer/factory if error persists.

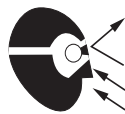
Maintenance & Troubleshooting

4.1 Warnings and Guidelines

The projector is an internationally approved product designed for safe and reliable operation. To assure complete safety at all times it is important to acknowledge the following precautions while operating the projector.

WARNING

NEVER look directly into the projector lens.
The high brightness of this projector could cause permanent eye damage.



WARNING

For protection from ultraviolet radiation,
keep all projector shielding intact during operation.

CAUTION

Installation should be performed by qualified personnel.

Labels and Markings ➤ Observe and follow all warnings and instructions marked on the projector.



The exclamation point within the equilateral triangle alerts the user to important operating and maintenance (servicing) instructions in the literature accompanying the projector.



The lightning flash and arrowhead symbol within the equilateral triangle alerts the user to uninsulated “dangerous voltage” within the projector’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

Instructions ➤ Read all operating instruction prior to using the projector.

Projector Location ➤ Operate the projector in an environment, which meets the operating range specified in *Section 5 – Specifications*.

- ◇ Do not operate the projector close to water, such as near a swimming pool. Do not operate in extremely humid environments.

- ◇ Do not place the projector on an unstable cart, stand or table. A projector and cart combination should be used with care. Sudden stops, excessive force and uneven surfaces may cause the projector and cart combination to overturn.

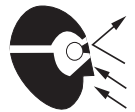
Lamp ➤ The two identical 100W UHP lamps should be replaced when they have reached their end of life, or have failed during operation. To effectively maintain operation of your projector it is best to be aware of any changes that occur in brightness and the number of hours each lamp is in use.

Follow all safety and warning precautions regarding lamp replacement and handling.

! LAMP WARNINGS !



It is recommended that you either turn off the projector before replacing a lamp or at least cutting power to the lamp you are about to remove when performing a hot-swap. If you turn the power off, wait approximately 5 minutes to allow the lamp to cool before removing.



To prevent physical injury, do not stick hands into the lamp module during lamp replacement.

The lamp is under great pressure when hot and may explode causing physical injury and/or property damage. Allow a lamp to cool before handling and/or powering down and unplugging the projector.

Use only the lamps specified and supplied by CHRISTIE
in the *Lamp Replacement Kit*.

Power Cord and Attachments ➤ Use only the attachments and/or accessories recommended by CHRISTIE. Use of others may result in the risk of fire, shock or personal injury.

! WARNING

Use only the AC power cord supplied by the manufacturer. Do not attempt operation if the AC supply is not within the specified voltage and power range.

- ◇ Do not set or rest items on the power cord. Locate the projector in an area where the projector cord cannot be abused or damaged by persons walking on it or by objects rolling over it.
- ◇ Operate the projector at the specified voltage only. Do not overload power outlets and extension cords as this can result in fire or shock hazards.
- ◇ The projector is equipped with a three-wire plug having a third grounding pin. This is a safety feature – if you are unable to insert the plug into an outlet contact an electrician to have the outlet replaced. Do not defeat the safety purpose of this grounding-type plug. *NOTE: The power cord supplied with the projector is approved for North American use only. An appropriately rated power cord with IEC320 type plug is required for European and other countries.*

Ventilation ➤ Slots and vents in the projector provide ventilation. Never block or cover these openings. This ensures reliable operation of the projector and prevents overheating.

- ◇ Do not place the projector over a radiator or heat register. The projector should not be placed in an enclosure unless proper ventilation is provided.
- ◇ Do not “poke” objects into the ventilation openings of the projector. They may touch dangerous voltages or short-out components resulting in a fire or shock hazard. Do not spill liquids of any kind into the projector. Should an accidental spill occur, immediately unplug the projector and have it serviced by a qualified service technician.

Servicing ➤ If any of the following conditions exist, immediately unplug the projector from the power outlet and ask a qualified service technician to look at it.

- ◇ The power cord has been damaged.
- ◇ The internal cooling fans do not start operating when the projector is first turned on. (*NOTE: Fans in the lamp ballast will start once lamp is ignited.*)
- ◇ Liquid has been spilled into the projector.
- ◇ The projector has been exposed to excessive moisture.
- ◇ The projector is not operating normally or its performance has significantly deteriorated in a short period of time.
- ◇ The projector has been dropped or the shipping case (if applicable) has been badly damaged.



WARNING

Do not attempt to service the projector yourself. All servicing must be performed by CHRISTIE accredited service technicians.

Use replacement parts that are manufacturer-approved only. Use of any other part other than the ones specified by the manufacturer can result in fire, electric shock or risk of personal injury and irreparable equipment damage.

4.2 Cleaning and Maintenance

The projector itself requires little or no cleaning if it is operated in an environmentally controlled environment. However, if you find that the projector may need some cleaning based on its performance call a qualified service technician.

The table below provides cleaning instruction for those items on the projector that may require periodic cleaning.



WARNING

Always power down and unplug the projector before any cleaning or servicing.

Table 4.1. Maintenance Guide

Part Description	Frequency	How to clean
Lens	<i>As required</i>	Clean if absolutely necessary. A small amount of dust on the lens has very little affect on picture quality. To clean: Apply a solvent such as Acetone, Alcohol or Vinegar sparingly to clean, lint-free lens tissue. Wipe in single sweep across the surface of the lens. Do not scrub or rub tissue in circular motion, this will scratch the lens. Do not reuse tissue. Do not use cleaning tools treated with Ether. If particles still appear on the lens, try using compressed air to remove.
Lamp (cleaning)	<i>Clean as required</i>	Clean if absolutely necessary. Never touch the glass surface of the lamp. Any oil (left by fingerprints) will seriously degrade lamp performance or cause “hotspots” which can lead to an accumulation of intense heat in the touched area and cause the lamp to shatter. To clean: Wait until lamp is cool. Moisten a clean, lint-free cotton cloth with isopropyl alcohol and gently rub the surface of the glass in a circular motion until clean.
Lamp (replacement)	<i>As required</i>	Since the projector can be operated in several lamp modes – lamp replacement intervals may vary. If you notice a significant change in the projector’s performance over a short period of time check the lamp hours and status of your lamps. <i>See “Lamp Replacement” later in this section for more details and a complete procedure on lamp replacement.</i>
Adjuster	<i>As required</i>	Remove dust and debris using a clean, lint-free cloth.
Exterior Module Covers	<i>As required</i>	Clean dust from external module covers using a clean, lint free cotton cloth as required. <i>NOTE: Before cleaning the modules, it is recommended that you install the lens cap. This will keep dust particles from settling on the glass surface of the lens.</i>

4.3 Replacing Keypad Batteries

Replace the batteries in the keypad when required. Use 4 AA size alkaline batteries.

To replace batteries:

- 1) Turn the keypad over to access the compartment at the back of the keypad.
- 2) Push the small tab in and up to lift the cover completely off.
- 3) Remove the batteries. Discard using appropriate methods.
- 4) Insert new batteries in the correct orientation - refer to the drawing etched on the inside of the compartment cover.
- 5) To close the compartment - insert the bottom edge of the cover into the groove around the upper edge of the compartment. Lower the compartment cover until the small tab “snaps” into place.

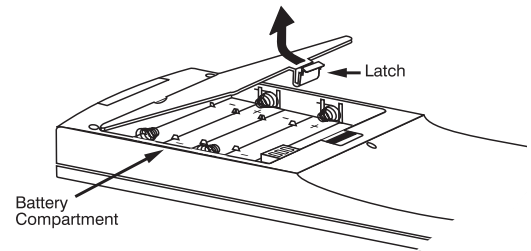


Figure 4.1. Open Keypad Battery Compartment

4.4 Lamp Replacement

The projector uses two identical 100W UHP (Ultra High Pressure) lamps and can be operated with both lamps ON (Dual Lamp Operation mode) or with one lamp ON (Single Lamp Operation mode). One of the projector's main features is that it automatically switches modes, if possible, to maintain continual operation. It is really important to be aware of your projector's status to effectively maintain continuous operation. Another feature of the projector is that you can replace an expired or faulty lamp without having to power the projector down or disrupt your current presentation – this is called “hot-swap”.

For more information on the lamp operation modes and other options in the Lamp menu, see 3.11 The Lamp Menu.

When should lamps be replaced?

Typically, aging lamps decrease slightly in their intensity. You can check the number of hours each lamp has been in use by checking **Lamp Hours** in individual lamp submenus. From the *Lamp* menu, you can also set a **Lamp Limit** (max 20,000 hours) and enable the projector to send a lamp replacement, warning message when it's powered on.

At anytime during operation, you can check the status of a lamp by checking the **Lamp Strike Status** in individual lamp submenus – *More, Lamp 1* or *More, Lamp 2*. You will see one of six states: “Good”, “Cooling Fan #3 Failed”, “Cooling Fan #5 Failed”, “Interlock Tripped”, “Failed to Strike” and “Turned Off Unexpectedly”. A status of “failed to strike” or “turned off unexpectedly” indicates a failure that requires further investigation and may or may not be directly related to the lamp.

If you have ruled out the cause being an aged lamp or another component in the projector, it may indicate that your lamp has prematurely burned out or failed for some other reason (check status LEDs and/or error codes through RS-232, if possible). Burned out lamps or lamps that have failed due to some characteristic flaw should be replaced, as soon as possible.

In general, monitor the performance of your projector and replace lamps as needed.


About the Lamp Hot-Swap Feature

The projector is designed with the ability to remain operational during lamp replacement. You can replace a single lamp without having to power down the projector. In this case, it is ***strongly recommended*** that you switch to the single lamp mode for the lamp that you are not replacing. For example, if you want to replace Lamp 1, switch to the Single, Lamp 2 mode of operation. By switching modes, you cut power to the lamp that you want to replace, only after the other lamp successfully turns on. It may take a minute for the lamp you just turned on to reach full brightness, but your presentation will not be interrupted.

Once you have removed a lamp from the module, the lamp interlock remains “open”. As an added safety feature, the projector will power down if you do not install another lamp (good or bad) back into the module within two minutes from the time you removed the old lamp.



Can “live” lamps be replaced?

Live lamps (lamps that are still on) can be hot-swapped out of the projector. However, this is not common practice and it is ***strongly recommended*** that you cut power to the lamp you are about to replace, by switching Single Lamp modes, as described above.

 If you still want to continue with replacing a “live” lamp it is important to remember that when the lamp is removed the power supply for that side of the module is still active. **Do not stick your hands in the empty lamp compartment!**

NOTE: If you pull the only “live” lamp out in Single Lamp mode, the projector automatically tries to turn the other lamp on. If this lamp was previously declared as a failed lamp, then the projector automatically powers down.

Before you proceed with lamp replacement.

- ◇ Read, and make sure you understand the Lamp Replacement procedure before you begin.
- ◇  Do not stick hands into an empty lamp compartment while the projector is still plugged into an AC outlet.
- ◇ Use caution when handling lamps. Lamps, even those that have been through a cool down period, are still hot due to the temperature emitted by the other operational lamp.
- ◇  Do not touch the glass surface of the lamp. Handle the lamp by its handle only. Intense heat can accumulate in areas where fingerprints exist. These “hotspots” can lead to an accumulation of intense heat, which may result in the lamp exploding. Wearing clean cotton gloves when handling the lamp will prevent getting fingerprints on the glass surface.

Replacing a Lamp

- 1) **TURN PROJECTOR OFF:** If your presentation allows, it is strongly recommended that you power down the projector prior to replacing a lamp. Press **Power*** to power down the projector. The projector fans will continue to operate for a short cool-down period. It is recommended that you wait approximately 5 minutes to allow lamps to cool before replacing.



It is strongly recommended that you allow the lamp to cool before replacing – approximately 5 minutes.

HOT-SWAP ALTERNATIVE

*Please read **About the Lamp Hot-Swap Feature** on the previous page before proceeding.*

If you choose to replace a lamp without disrupting the current presentation, it is recommended that you switch to the Single Lamp mode for the lamp you are not going to replace. Then proceed with Step 2. *NOTE: The projector will not automatically return to its original Lamp Mode after lamp replacement. This must be done manually, if desired.*

- 2) **OPEN LAMP COMPARTMENT:** Loosen the two screws on the lamp door you want to open. Swing the door open. (Figure 4.2.) *NOTE: Each lamp door is spring-loaded and needs to be held open during lamp replacement.*

For CS50/CS70: Remove the rear access panel, mounted to the back of the display cube, to access the projector's lamp module.

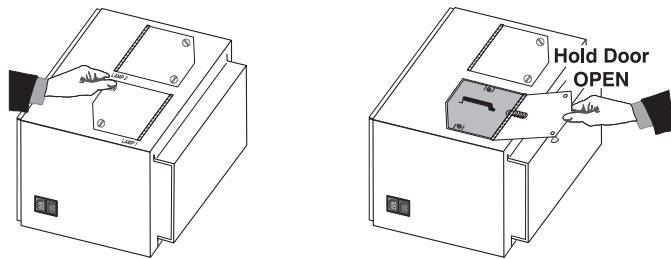


Figure 4.2.

- 3) **REMOVE LAMP:** Loosen the two screws securing the lamp in the lamp module. Holding the lamp door open with one hand, grasp the lamp handle and pull straight up to remove the lamp. (Figure 4.3. and Figure 4.4) *The lamp disconnects from the terminal block much like unplugging something from an outlet.*

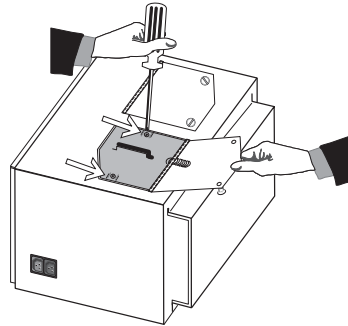


Figure 4.3.

- ⚠ DO NOT touch the glass surface of the lamp. Set it aside for proper disposal once it has cooled down.**

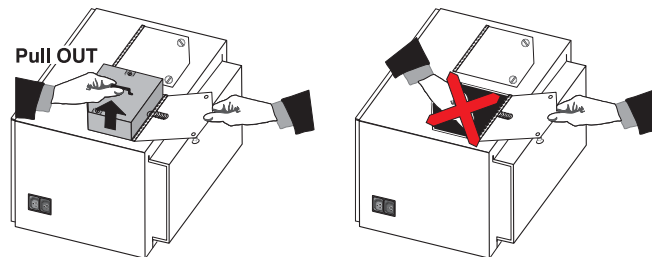
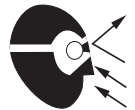


Figure 4.4.

⚠ WARNING ⚠



Never look or stick hands inside an open lamp compartment while the other lamp is still ON. Power is still present in the lamp module and the heat and U.V. light from the remaining operational lamp could cause physical injury.



- 4) **INSERT NEW LAMP:** a) Hold the new replacement lamp above the lamp compartment. Align the two holes on the lamp module with the locating pins located on the edge of the lamp compartment. See Figure 4.5.

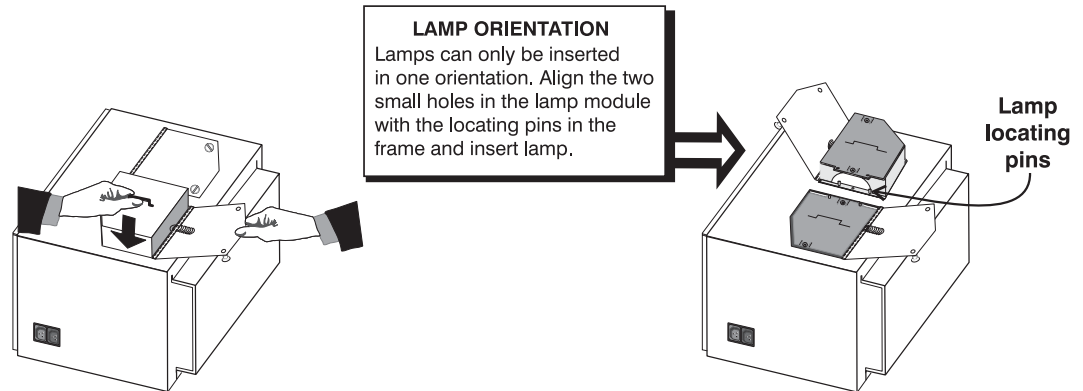


Figure 4.5

- b) Slide the lamp all the way down until it is fully seated into the compartment. See Figure 4.6.

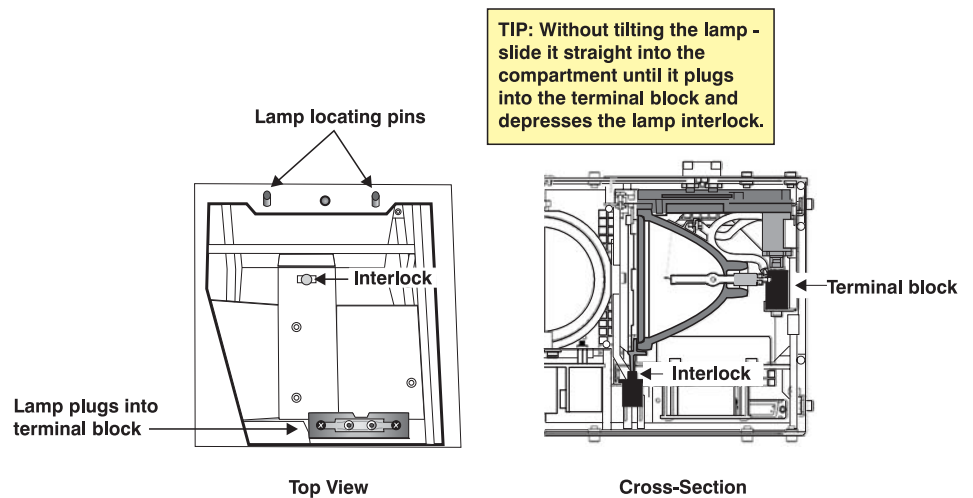


Figure 4.6. Inside the Lamp Compartment

- c) Tighten the two screws on the lamp module just until snug to hold it in place.

⚠ WARNING

Do not over-tighten lamp screws – it could potentially damage the lamp module. Tighten only until snug.

- 5) **CLOSE LAMP DOOR:** Once the lamp is inserted, carefully close the spring-loaded lamp door and lock it by tightening the two lamp door screws.

⚠ Watch your fingers! The lamp door is spring-loaded and will snap close. Keep fingers clear from the lamp compartment opening when closing the lamp door.

- 6) **TURN THE PROJECTOR ON (IF APPLICABLE) OR SWITCH BACK TO THE ORIGINAL LAMP OPERATION MODE:** Press **Power** to turn the projector on. If you

performed a hot-swap, use the *Lamp* menu to return to the original lamp operation mode you were in.

- 7) **RESET LAMP HOURS:** Access the *Lamp* menu (item 5. in *Main Menu*) and select the submenu for the lamp that you are replacing – *More, Lamp 1* or *More, Lamp 2*. From the submenu, select the **Change Lamp** option. Enter the new serial number in the **Lamp S/N** text box. When the new number is recorded, the lamp timer will automatically reset to “0” hours and begin to log time.






NOTES: 1) Once entered, the new lamp serial number is also automatically added to the Lamp History submenu (read-only). 2) Lamp life data is required for warranty claims.

IMPORTANT

If you fail to enter a serial number the lamp timer will not automatically reset to “0” and inaccurate lamp hours will be shown in the Status menu. The lamp life limit may then expire prematurely.

4.5 Troubleshooting

Use the following table as a guide in identifying general operating problems, the cause and how they can be corrected. Most of these problems can be corrected by a User and do not require the assistance of a qualified technician. The more “technical” problems that require the attention of a qualified technician can be found in the Service Manual.

<p>Symptom ➤</p> <p>CAUSE / REMEDY:</p>	<p>The projector does not power on when the  key is pressed.</p> <ol style="list-style-type: none"> 1. To power up make sure you press the  key for at least 1 second or quickly press the  key followed by the  key. 2. Check the status of the LEDs on the input panel. Are they lit? If not, check the connection of your power cord to the wall outlet. 3. Does the green “Status” LED produce a single flash with each keypress? If not, it is not receiving any of the keypad IR signals. Point the keypad directly at the center of the screen – the IR sensor is located at the front of the projector. Also ensure that there is nothing blocking the transmission path. 4. Replace the keypad batteries. See the instructions earlier in this section. 5. Ensure the keypad protocol has not been changed for your keypad. See <i>Section 2</i>. 6. Ensure both lamp have been installed and are fully seated in the module. Refer to the <i>Lamp Replacement</i> procedure in this section.
<p>Symptom ➤</p> <p>CAUSE / REMEDY:</p>	<p>The projector is on, but no image is displayed...</p> <ol style="list-style-type: none"> 1. Make sure the lens cap has not been left on. 2. Ensure projector is not in standby mode? Press  to clear. 3. Is an active source connected properly? Check all cable connections. 4. Are there test patterns or menus present? If yes, check your source connections again. 5. Make sure the room lighting is not too bright. Reduce light reflections as much as possible. 6. Increase contrast and/or brightness of image. 7. Make sure the projector is not too far away from the screen.

8. Is the “Status” LED flashing a pattern of yellow and red lights while the “Power” LED is steady red? This indicates an internal system error that may prevent the projector from operating. If the problem persists contact a qualified service technician.

Symptom ➤ The projector does not respond to the infrared remote keypad...

CAUSE / REMEDY:

1. Check to see if the wired keypad works. If yes, check that the correct protocol is used for that keypad.
2. Make sure there is nothing blocking the transmission path between the keypad and IR sensor.
3. Check keypad batteries.
4. Keep ambient lighting to a minimum. This may be interfering with keypad IR transmission.
5. Ensure the keypad has not been disabled for use with this projector. Press **Proj** to broadcast to all projectors.

Symptom ➤ The projector powers down unexpectedly...

CAUSE / REMEDY:

1. Check status LEDs for an error code. Refer to *Table 3.2 System Error Codes*.
2. For each lamp, check lamp hours via RS-232. Replace lamp(s) if necessary.
3. Check that lamp fans #3 and #5 are operational.
4. For each lamp, check lamp hours via RS-232 and that they are fully inserted. If the projector detects both lamps have failed or not installed correctly (lamp interlock “open”), it will power down automatically.
5. If this occurs during lamp replacement it could indicate that one of the lamp interlock is “open” for longer than the allowable 2-minute time frame. Make sure when you remove a lamp from a compartment during a lamp hot-swap, you replace it with another lamp (good or bad) to prevent the projector from shutting down.

Symptom ➤ The display is jittery or unstable...

CAUSE / REMEDY:

1. If the display is jittery or if it disappears and reappears erratically then check that the source is properly connected and that its signal is of adequate quality for detection. For example, if the projector scans the default input for a signal to display, and a poor quality or improperly connected source is connected then the projector will briefly and repeatedly attempt to display an image. If no source is connected, the “No signal” error message appears over a blank display. Correct the source connection.
2. The horizontal or vertical scan frequency of the input signal may be out of range of the projector. Refer to *Section 5, Specifications*.
3. The sync signal may be inadequate. Correct the source problem.
4. The input signal type may conflict with the input module. Install/use the correct module for the source.
5. Pixel tracking, phase, filter, etc. may need more adjustment.

Symptom ➤ The display is faint...

CAUSE / REMEDY:

1. Check the **Input Levels** options (under *Image Settings*) and turn the **Auto Input Level** to OFF then ON.
2. Brightness and/or contrast may be set too low. Adjust as necessary.

3. The gamma setting may be inadequate. It is recommended that the “default” gamma setting be used for most sources.
4. The projection room may be too bright. Limit the amount of light reflecting off the screen.
5. Ensure the projector is not too far from the screen.
6. Is the screen being viewed from the best angle? Check seating plans and viewing angles.
7. Ensure the source is only terminated once.
8. The source (if non-video) may need sync tip clamping. Enter a check in the **Clamp Tip** box in the *Input Levels* submenu.
9. Check if lamp operation mode changed – could indicate a lamp failure, lamp turned off unexpectedly or fans failed. Check RS-232, LEDs and Lamp Status.

Symptom ➤ The display is reversed and/or upside down...

- CAUSE / REMEDY:**
1. Image orientation is not set correctly. Access **Image Orientation** in the *Configuration* menu. See *Section 2*.

Symptom ➤ Portions of the display are cut off or warp to the opposite edge...

- CAUSE / REMEDY:**
1. Reduce top, bottom, left or right blanking from within the *Size and Position* menu. Check adjustments.
 2. Resizing may need some adjustment. Adjust until entire image is visible and centered.

Symptom ➤ The display appears compressed or stretched...

- CAUSE / REMEDY:**
1. The frequency of the pixel sampling clock is incorrect for the current source.
 2. Size and position options may be adjusted incorrectly for the incoming source.

Symptom ➤ The image appears to drift from good to bad and visa versa...

- CAUSE / REMEDY:**
1. The operating temperature of the projector may be fluctuating. Watch that the projector is not located too close to heating/air conditioning vents.
 2. The source input signal may be of low quality.
 3. The horizontal or vertical frequency of the input may have changed at the source end.

Symptom The display has suddenly frozen, or an unknown menu has appeared...

- CAUSE / REMEDY:**
1. You may have accidentally entered a special engineering code using the **[Func]** key in combination with certain numbers, or you may have selected the “Freeze Image” option. Press **[Exit]** as necessary to cancel the function and return to presentation level.

Symptom ➤ A split rolling image has appeared...

- CAUSE / REMEDY:**
1. The electronics of the projector require resetting – press **[Power*]** **[V OFF]** / **[A ON]** and then press **[Func]** **[9]** **[9]** **[9]** .

Symptom ➤ The display is not sharp or “clean”...

- CAUSE / REMEDY:**
1. More display adjustment may be required – focus, brightness, contrast, pixel tracking, pixel phase, and detail.
 2. If you are using a BNC T-connector, try using a distribution amplifier to boost signal levels.

3. Is the video input signal properly terminated? Set in *Image settings – Video Options* menu.
4. The screen size may be too large. As screen size increases, magnification increases, reducing brightness and clarity. See lens specifications in *Section 5*.
5. The source input signal may be of low quality. Try another source.

Symptom ➤ Colors in the display are inaccurate...

CAUSE / REMEDY:

1. The color, tint, gamma, color space and/or color temperature settings may require adjustment. Review all settings. See also *Section 3* for descriptions and instructions.
2. Check cable connections. Make sure Red is red, etc.

Symptom ➤ Turning White Boost ON appears to dim image...

CAUSE / REMEDY:

1. For all new sources, perform **Auto Setup** (accessible in *Main* menu) and enable **Auto Input Levels** (*Input Levels*) before applying **White Boost**. Note: **Auto Setup** should automatically optimize your input levels for the most common sources. Only trained technicians should adjust input levels, if further adjustment is required.

Symptom ➤ The display is not rectangular...

CAUSE / REMEDY:

1. Check leveling of the projector. If necessary, try relocating the projector or screen so that the lens surface and screen are approximately parallel.
2. The adjuster mechanism may need tweaking in one of its axes.
3. The **Vertical Stretch** option may need adjustment. Also check pixel tracking.
4. Turn keystone to 50.0.

Symptom ➤ The display is “noisy”...

CAUSE / REMEDY:

1. Display adjustment may be required. Adjust pixel tracking, phase and filter. Noise is particularly common on YPbPr signals from a DVD player.
2. The video input may not be terminated. Make sure the video input is terminated (75Ω). If it is the last connection in a loop-through chain, the video input should be terminated at the *last* projector only.
3. The signal cables carrying the input signal may be of poor quality. Use only good quality signal cables.
4. Switching between analog and digital sources (both connected to EM at the same time) – disconnect the source that is not being used.
5. The distance between the input source device and the projector may be too great. If the distance between the input source device and the projector is greater than 25 feet, signal amplification/conditioning may be required.
6. The input signal may be of poor quality.
7. If the source is a VCR or off-air broadcast, detail may be set too high. Keep near 4 for most sources. (Check defaults - may be different for other sources.)

Symptom ➤ The display suddenly went dim...

CAUSE / REMEDY:

1. Lamp operation mode switched from Dual Lamp to Single Lamp – check Lamp menu to confirm. Lamp may require replacement.

Symptom ➤ *There is noticeable flicker effects in the display...*

CAUSE / REMEDY:

1. Try turning the **Lamp Conditioning** option (*Lamp* menu) ON. If the entire image is showing signs of flicker, it may be due to the inherent characteristic of the UHP lamps. Turning **Lamp Conditioning** ON should gradually reduce this effect.
2. Are you using an external signal with low frame rates (<48Hz)? Turn Lamp Conditioning OFF to improve.

Symptom ➤ *In a multiple display wall, the display of one projector set at 100W is brighter than that of an adjacent display with the projector set at 120W...*

CAUSE / REMEDY:

1. Check the lamp hours of the projector displaying the dimmer image. Does the lamp need to be replaced?
2. During primary color adjustment, try turning down the green white level of the brighter projector until both projectors match in overall brightness. Then continue with other adjustments as usual.

Symptom ➤ *Can't seem to match whites between multiple displays....*

CAUSE / REMEDY:

1. It is strongly recommended that you use an internal 100% white field test pattern when trying to adjust primary colors.
2. Turn **White Boost** OFF (move sidebar to a value of 0) when using an internal 100% white field test pattern to adjust primary colors.
3. Set all projectors in a multiple display to the same power level and lamp operation mode before adjusting primary colors and/or input levels.

Specifications

5.1 Specifications

NOTES: 1) Due to continuing research, specifications are subject to change without notice. 2) Specifications apply to all models unless otherwise noted. 3) CS50/CS70 screens are sold separately.

Display ► Display Resolution

SXGA resolution, 1280 X 1024 pixels

Achievable Brightness

Product	Lamp Mode	100W UHP		120W UHP	
		Standard Mode	Boost Mode	Standard Mode	Boost Mode
RPMS	<i>Single</i>	315 lumens	450 lumens	375 lumens	550 lumens
	<i>Dual</i>	630 lumens	900 lumens	750 lumens	1100 lumens
CS50 (Wide Angle Screen)	<i>Single</i>	116 cd/m ²	N/A	280 cd/m ²	N/A
	<i>Dual</i>	233 cd/m ²	N/A	140 cd/m ²	N/A
CS70 (High Gain Screen)	<i>Single</i>	227 cd/m ²	327 cd/m ²	272 cd/m ²	392 cd/m ²
	<i>Dual</i>	454 cd/m ²	654 cd/m ²	545 cd/m ²	784 cd/m ²
CS70 (Wide Angle Screen)	<i>Single</i>	53 cd/m ²	77 cd/m ²	64 cd/m ²	92 cd/m ²
	<i>Dual</i>	106 cd/m ²	153 cd/m ²	128 cd/m ²	184 cd/m ²

Contrast Ratio

> 500:1 full field on/off

Gray Scale and Color Resolution

8 bits resolution

16.8 million displayable colors

Color Temperature

Default (White Boost ON)

(100% white) 5500K ± 500K

Range of adjustment

3200K – 9600K

Brightness Uniformity (single lamp mode)

- **FOR RPMS**
> 90%, adjustable to 100% uniformity
- **FOR CS50/CS70 with Wide Angle LG Screen**
>90%
- **FOR CS70** with High Gain Screen
>70%

Source Input Compatibility ➤ Analog RGB (interlaced or progressive scan formats)

Horizontal frequency range	15-120 kHz
Vertical frequency range	23.97 – 120Hz
Scan format	Interlaced or progressive
Pixel clock rate (maximum)	160 MHz max.
Nominal Impedance	75 ohms

Sync (interlaced or progressive scan formats)

Horizontal frequency range	15-120 kHz
Vertical frequency range	23.97 – 120Hz
Scan format	Interlaced or progressive
Sync Types	Separate H and V Composite (bi-level and tri-level) Sync-on-green/luma (bi-level and tri-level)
Polarity	positive or negative

Composite Video and S-Video (requires optional Video Decoder Module)

Signal Formats	Composite video (CVBS), S-Video (Y/C),
Video Standards	NTSC, NTSC 4.43, PAL, PAL M, PAL N, PAL60, SECAM
Nominal Impedance	75 ohms

Inputs (D100UF) ➤ Analog Inputs

VESA Standards Supported		
Resolution	1280 x 960	1280 x 1024
Pixel Frequency (MHz)	108	108
H-Frequency (KHz)	60	63.96
H Width (pix)	112	112
H Back Porch (pix)	312	248
Tracking	1800	1688
V-Frequency (Hz)	60	60
V Width (lines)	3	3
Total Lines	1000	1066
Type	Progressive Scan	Progressive RGB

Sync

Horizontal Frequency Range	VESA15 & VESA17
Vertical Frequency Range	VESA15 & VESA17
Scan Format	Progressive
Sync Types	Separate H & V

Power Requirements ➤	Voltage Range	100 - 240 VAC
	Line Frequency	50 Hz – 60 Hz nominal
	Inrush current	68A max
	Current rating	One lamp ON 2.3A @ 100V (typical), 1A @ 240V (typical) Two lamps ON 3.75A @ 100V (typical), 1.6A @ 240V (typical)
	Power Consumption	One lamp ON – 230W nominal Two lamps ON – 375W nominal

Lamps ➤	Type	100W UHP
	Power	100 Watts
	Warm-up to full brightness	5 minutes
	Lamp Operation Mode (default)	Single

Lens ➤ 0.76:1 short throw or 1.25:1 medium throw

Environmental Conditions ➤

Operating	Temperature	10°C to 35°C
	Humidity	25% to 65% non-condensing
	Altitude	0 to 4000 meters
Non-operating	Temperature	-20°C to 35°C
	Humidity	20% to 65% non-condensing
	Altitude	0 to 15000 meters

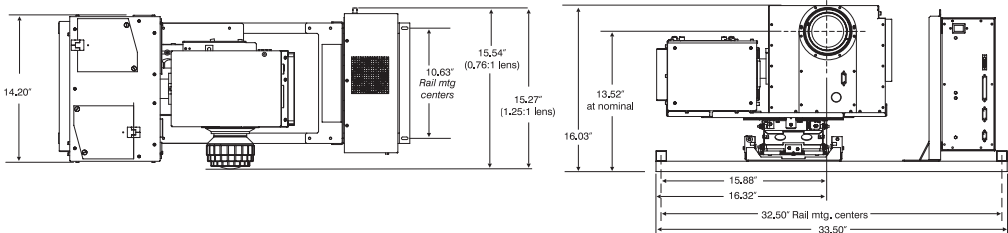
Physical Characteristics ➤

Weight (without lens, including adjuster)	< 77lb. shipping weight includes packaging <100lb.
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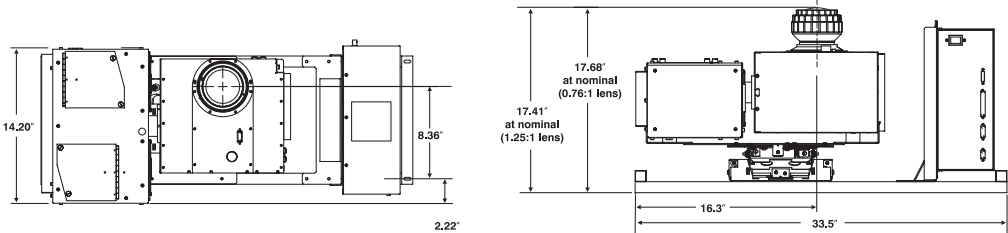
Size (includes lens, adjuster and mounting rails)

For RPMX

Lens Horizontal (0 degree)



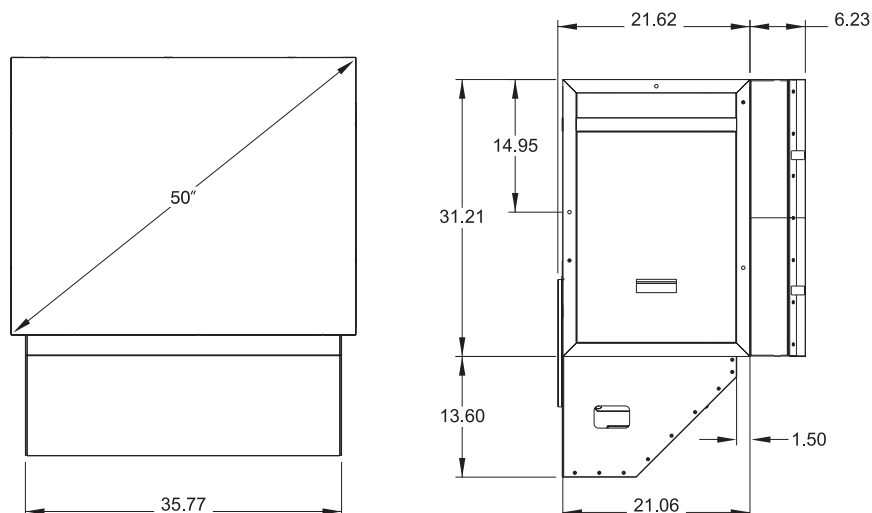
Lens Vertical (90 degree)



For CS50

Weight (without screen, top cover, pedestal or packaging) 217 lbs.

Size

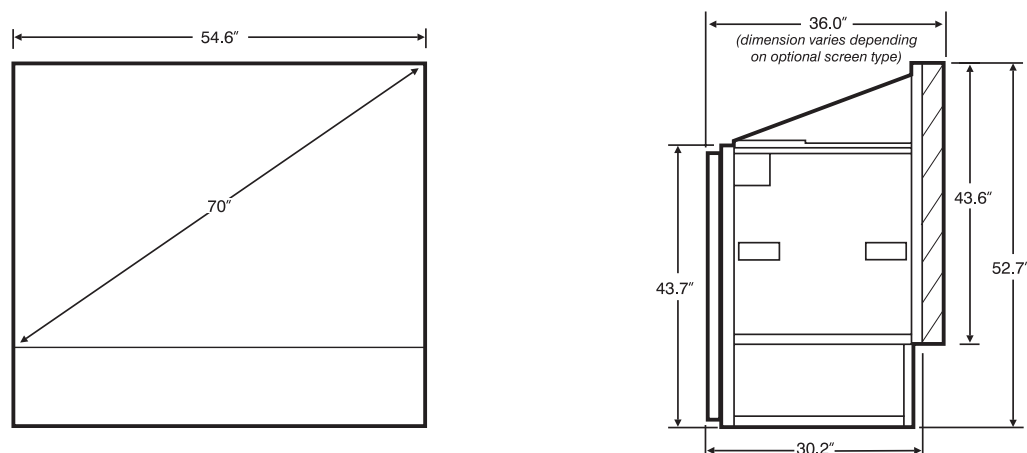


For CS70

Weight (without screen, top cover, pedestal or packaging) 220 lbs.

Size

CS70-D100U (38-GFX052-01) OR CS70-D100UF (38-GFX053-01)



Safety and Regulatory Compliance

► CAN/CSA C22.2 No 60950-00 UL 60950 3rd Edition
UL 1950 3rd Edition
EN60950 European Norm, Safety of Information Technology Equipment

Electro-Magnetic Compatibility (E.M.C) Emissions
FCC Code of Federal Regulations, Title 47, Part 15, Conducted and Radiated Emissions, Class A

EN55022 (CISPR 22) for Information Technology Equipment, Conducted and Radiated, Class A

EN61000-3-2 Induced Harmonic Distortion

EN61000-3-3 Induced Voltage Fluctuations (Flicker)

Electro-Magnetic Compatibility (E.M.C) Immunity

EN55024 specific to Information Technology Equipment (all parts), under which are;

EN61000-4-2 ESD,

EN61000-4-3 Radiated Immunity

EN61000-4-4 Fast Transient/Burst Immunity

EN61000-4-5 Surge Immunity

EN61000-4-6 Immunity to Conducted Disturbances

EN61000-4-8 Magnetic Field Immunity

EN61000-4-11 Voltage Dips, Short Interruptions and Voltage Variations Immunity

Optional Accessories ➤ Optional Interfaces

- RGB 500 Input Module (38-804606-xx)
- RGB 400 Active Loop Thru Input Module (38-804607-xx)
- RGB 400 Buffered Amplifier Input Module (38-804610-xx)
- Composite/S-Video Input Module (38-804608-xx)
- PC250 Analog Input Module (38-804609-xx)
- Serial Digital Input Module (38-804602-xx)
- Digital HDTV Input Module (38-804611-xx)
- Video Decoder Module (38-804600-01)

For CS50 products

50" Wide Angle LG Screen 38-804826-02

Pedestal 38-804823-01

Pedestal Stabilizer Kit 38-804820-01

Pedestal Side Panel Kit 38-804834-01

Eyebolt Kit 38-804838-01

For CS70 products

70" High Contrast Screen 38-804812-04

70" Wide Angle LG Screen 38-804824-01

Pedestal 38-804814-03

Pedestal Stabilizer Kit 38-804820-01

Pedestal Side Panel Kit 38-804819-01

Pedestal Top Cover Kit 38-804815-01

Eyebolt Kit 38-804839-01

NOTE: Additional User's Kits can be purchased separately (includes manuals, setup tools, IR remote with batteries). RPMS #38- 804867-01, CS50/CS70 #38-804827-01.

Appendix A

Glossary

This appendix defines the specific terms used in this manual as they apply to this projector. Also included are other general terms commonly used in the projection industry.

Active Line Time ➤ The time, inside one horizontal scan line, during which video is generated.

Ambient Light Rejection ➤ The ability of a screen to reflect ambient light in a direction away from the "line of best viewing". Curved screens usually have good ambient light rejection. Flat screens usually have less ambient light rejection.

Analog Video ➤ The video output of most computers and videotape machines. Analog video can generate a large number of colors.

Aspect Ratio ➤ The ratio of the width of an image to its height, such as the 4:3 aspect ratio common in video output.

Auto Source ➤ The ability of the projector to automatically recognize and synchronize to the horizontal and vertical scan frequencies of an input signal for proper display.

Bandwidth ➤ The frequency range of the projector's video amplifier.

Baud Rate ➤ The speed at which serial communications travel from their origin. In this projector, the RS-232 or RS-422 default baud rate of 19200 can be changed to match a controlling device. The switcher baud rate of 9600 cannot be changed.

Blanking Time ➤ The time inside one scan line during which video is not generated. The blanking time of the input signal must be equal to or greater than the retrace time of the projector.

Brightness ➤ In projection, brightness usually describes the amount of light emitted from a surface such as a screen. It is measured in foot-lamberts or candelas per square meter.

Candela or Candle ➤ Unit of measure for measuring intensity of light.

Channel ➤ A collection of measurements stored by the projector for a given input source, including frequencies, pulse width, polarity, syncs, channel number and location, user-adjustable display settings, etc. Use channels to switch between a variety of setups quickly, automatically recalling previously defined display parameters.

Channel List ➤ A list/menu of previously-defined channels available in projector memory.

Channel Number ➤ A number that uniquely identifies a specific channel retained in projector memory. The projector can retain up to 99 channels.

- Checkbox** ➤ A menu item that indicates whether an option is currently in effect (checked) or not (unchecked).
- Color Shift** ➤ A change in the tint of a white field across an image.
- Color Temperature** ➤ The coloration (reddish, white, bluish, greenish, etc.) of white in an image, measured using the Kelvin (degrees K) temperature scale. Higher temperatures output more light.
- Component Video** ➤ See *YCbCr* or *YPbPr*.
- Composite Video** ➤ The output of video tape players and some computers, characterized by synchronization, luminance and color signals combined on one output cable.
- Contrast (ratio)** ➤ The degree of difference between the lightest and darkest areas of the image.
- Convergence** ➤ The alignment of the red, green, and blue elements of a projected image.
- Curved Screen** ➤ A projection screen which is slightly concave for improved screen gain. Curved screens usually have screen gains, which are greater than 1 but viewing angles much less than 180°. Curved screens are not recommended for use with this projector.
- DDI** ➤ A “direct digital interface” signal can be supplied to the projector via an optional digital input module installed in **INPUT 2**. For example, you can input an SMPTE-259M signal using a *Serial Digital Input Module* or input an SMPTE-272M signal from a *Digital HDTV Serial Input Module*.
- DMD™** ➤ Digital Micromirror Devices™ used in this projector for processing red, green, and blue color data.
- Decoder** ➤ Located at **INPUT 3** and **INPUT 4**, this device converts NTSC 3.58, NTSC 4.4, PAL, PAL-N, PAL-M, or SECAM to RGB video.
- Detail** ➤ The sharpness of a display from a video source.
- Diffused Screen** ➤ A type of rear-projection screen which spreads the light striking it. Screen gain is less than 1 but audience viewing angles are increased.
- Display Setting** ➤ An adjustment that affects the display of an image. Such display settings include contrast, brightness, tint, blanking, size, offsets, and others.
- Flicker** ➤ A very rapid variation in image brightness caused by a frame rate that is too slow. (See *Interlace*) See also *Lamp Flicker*.
- Frame Rate** ➤ The frequency at which complete images are generated. For non-interlaced signals, the frame rate is identical to the vertical frequency. For interlaced signals, the frame rate (also known as field rate) is one half of vertical frequency.
- Foot-candle** ➤ The intensity of visible light per square foot.
- Foot-lambert** ➤ The luminance (brightness) which results from one foot-candle of illumination falling on a perfectly diffuse surface.
- Gain or Screen Gain** ➤ The ability of a screen to direct incident light to an audience. A flat matte white wall has a gain of approximately 1. Screens with gain less than 1 attenuate incident light;

screens with gain more than 1 direct more incident light to the audience but have a narrow viewing angle. For example: An image reflecting off a 10 gain screen appears 10 times brighter than it would if reflected off a matte white wall. Curved screens usually have larger gain than flat screens.

Help Screen ➤ A display of help information regarding the current task or presentation.

Horizontal Frequency ➤ The frequency at which scan lines are generated, which varies amongst sources. Also called horizontal scan rate or line rate.

Horizontal Offset ➤ The difference between the center of the projected image and the center of the projector lens. For this projector, this value is expressed as the maximum percentage of the image that can be projected to one side of the lens center without degrading the image quality. Horizontal offset ranges can be affected by the type of lens in use, and whether or not the image is offset vertically at the same time.

Hot Spot ➤ A circular area of a screen where the image appears brighter than elsewhere on the screen. A hot spot appears along the line of sight and "moves" with the line of sight. High gain screens and rear screens designed for slide or movie projection usually have a hot spot.

Input ➤ A physical connection route for a source signal, described by a 2-digit number representing 1) its switcher/projector location and 2) its slot in the switcher/projector.

Input Signal ➤ Signal sent from a source device to the projector.

Interface ➤ A device, such as the *Serial Digital Input Module*, that accepts an input signal for display by the projector.

Interlace ➤ A method used by video tape players and some computers to double the vertical resolution without increasing the horizontal line rate. If the resulting frame/field rate is too low, the image may flicker depending on the image content.

Keypad ➤ A small push-button device for controlling most projector settings and operation. For more information, refer to 3.3, *Using the Keypad*.

Keystone ➤ A distortion of the image which occurs when the top and bottom borders of the image are unequal in length. Side borders both slant in or out, producing a "keyhole" shaped image. It is caused when the screen and lens surface are not parallel, or (in "X" models) by poor Keystone adjustment.

Lamp Flicker ➤ As the lamp ages, the shape of two anodes may change from two points to a flattened state. When this occurs, the arc jumps across the gap from varying points. This is seen as image flicker. Turning the Lamp Conditioning feature ON will pulse the lamp and gradually "condition" the two anodes back to two points. Lamp Conditioning may take seconds, minutes or hours to reach full effectiveness. NOTE: Lamp flicker can occur at any time in the lamp's life. The length of time, over which flicker may occur varies considerably and unpredictably. This behavior is inherent in UHP lamps.

Linearity ➤ The reproduction of the horizontal and vertical size of characters and/or shapes over the entire screen.

- Line of Best Viewing** ➤ When light from a projector is incident on a screen, the light reflects from the screen such that the angle of reflection equals the angle of incidence. The Line of Best Viewing is along the line of reflection.
- Loopthrough (Loopthru)** ➤ The method of feeding a series of high impedance inputs from a single video source with a coaxial transmission line in such a manner that the line is terminated with its characteristic impedance at the last input on the line.
- Lumen** ➤ The unit of measure for the amount of visible light emitted by a light source.
- Lux** ➤ The amount of visible light per square meter incident on a surface.
 $1 \text{ lux} = 1 \text{ lumen/square meter} = 0.093 \text{ foot-candles}$
- Menu** ➤ A list of selectable options displayed on the screen.
- NTSC Video** ➤ A video output format of some video tape and disk players. There are two types of NTSC (National Television Standards Committee) video: NTSC 3.58 and NTSC 4.43. NTSC 3.58 is used primarily in North America and Japan. NTSC 4.43 is less commonly used.
- Optical Screen** ➤ A type of rear-projection screen which re-directs light through the screen to increase image brightness in front of the screen. Screen gain is usually greater than 1 but audience viewing angles are reduced.
- PAL Video** ➤ PAL (Phase Alternating Line) video is a 50 Hz standard with 768 x 576 resolution. It is found on some video tape and disk players (used primarily in Europe, China and some South American and African countries).
- Pixel** ➤ The smallest discernible element of data from a computer-generated image.
- Pixel Phase** ➤ The phase of the pixel sampling clock relative to incoming data.
- Pixel Tracking** ➤ The frequency of the pixel sampling clock, indicated by the number of pixels per line.
- Presentation Level** ➤ The projector is at presentation level when an image from a source is displayed without the presence of a slidebar, menu, pull-down list, or error message.
- Projector-to-Screen Distance** ➤ The distance between the projector's front feet centers and the screen. Also called "Throw Distance".
- Protocol** ➤ The type of code format called "A" or "B" utilized by the remote keypad(s). The default protocol set at manufacture is Protocol "A". By using two different keypad protocols, adjacent projectors can be controlled independently with their remote IR keypads.
- Pull-down List** ➤ A selectable menu item that unfolds into a list of options pertaining to it.
- Rear Screen** ➤ A translucent panel for screen projection. Incident light travels through the incident surface of a rear screen and forms an image on the other surface.
- Resizing** ➤ The ability to manipulate through software commands the physical size, placement and/or aspect ratio of an image.

Resolution (lens) ➤ The maximum number of alternate white and black horizontal lines that can be distinguished on a screen when a photographic target is placed between the lens and a light source and illuminated by that source.

Resolution (projector) ➤ The maximum number of pixels that the projector can display horizontally and vertically across an image, such as 1024 x 768 (called XGA).

Retrace Time (Horizontal) ➤ The minimum time required for a CRT projector to move the position of the scanning spot from the right edge to the left edge.

Rise Time ➤ The time required by the video amplifier of the projector to increase its output from 10% to 90% of the maximum value.

RGB Video ➤ The video output (analog or digital) of most computers. Analog RGB video can have 3, 4, or 5 wires — one each for red, green, and blue, and either none, one or two for sync. For three-wire RGB, the green wire usually provides sync. (See TTL Video).

RS-232 ➤ A common asynchronous data transmission standard recommended by the Electronics Industries Association (EIA). Also called serial communication.

RS-422 ➤ A less common asynchronous data transmission standard in which balanced differential voltage is specified. RS-422 is especially suited to long distances.

S-Video ➤ The output from certain video tape players and video equipment. S-Video separates sync and luminance from color information, typically producing a higher quality display than composite video.

Scan Rate ➤ The horizontal or vertical frequency at which images are generated.

Scan Line ➤ One horizontal line on the display.

SECAM ➤ A video output format of some video tape and disk players (used primarily in France). SECAM (Sequential Couleur à Mémoire) signals are similar in resolution and frequency to PAL signals. The primary difference between the two standards is in the way color information is encoded.

Slidebar ➤ A slidebar is a graphical display of an adjustable setting. The numerical setting often represents a percentage but can be a specific unit such as degrees Kelvin.

Source ➤ The device, such as a computer or VCR, connected to the projector for display. A source may have numerous corresponding channels defined and recognized by the projector. See *Input*.

Source Setup ➤ See *Channel*.

Switcher ➤ A signal selector that can be connected to a projector for the purpose of adding more sources.

Sync ➤ This term refers to the part of the video signal that is used to stabilize the picture. Sync can occur in three forms:

- 1) "Composite sync": the horizontal and vertical components are together on one cable.
- 2) "Sync-on-green": the sync is part of the green video.

- 3) "Separate sync" or "H.SYNC and V.SYNC": the horizontal and vertical components of the sync are on two separate cables.
- Sync Width** ➤ The duration of each sync pulse generated by a computer. The sync width is part of the blanking time.
- TTL Video** ➤ A type of RGB video with digital characteristics.
- Throw Distance** ➤ The distance between the front feet of the projector and the screen. Also called "Projector-to-Screen Distance". Always use the correct Christie throw distance formula to calculate the proper throw distance ($\pm 5\%$) required for your lens.
- Tint** ➤ Balance of red-to-green necessary for realistic representation of NTSC signals.
- Variable Scan** ➤ The ability of a projector to synchronize to inputs with frequencies within a specified range.
- Vertical Frequency** ➤ The frequency at which images are generated. Vertical frequencies vary amongst sources. Also called vertical scan rate.
- Vertical Offset** ➤ The difference between the center of the projected image and the center of the projector lens. For this projector, this value is expressed as the maximum percentage of the image that can be projected above or below the lens center without degrading the image quality. Vertical offset ranges depend on the type of lens in use, and whether or not the image is offset horizontally at the same time.
- Video** ➤ The signal that is used by display devices (such as projectors) to generate an image. This term also refers to the output of video tape/disk players and computers.
- Video Decoder** ➤ An optional device that converts NTSC 3.58, NTSC 4.4, PAL, PAL-N, PAL-M or SECAM to RGB video.
- Video Standard** ➤ A specific type of video signal, such as NTSC, PAL, SECAM. This projector can automatically recognize and interpret the incoming standard and display accordingly.
- Viewing Angle** ➤ Screens do not reflect equally in all directions. Most light is reflected in a conical volume centered around the "line of best viewing". Maximum brightness is perceived if you are within the viewing cone defined by the horizontal and vertical viewing angles.
- White Balance** ➤ The color temperature of white used by the projector.
- White Field** ➤ The area of an image that is white only. For example, a full white field is an image that is white everywhere. A 10% white field is a white area (usually rectangular) that occupies 10% of the image; the remaining 90% is black.
- YCbCr** ➤ A high-end *digital* component video signal.
- YPbPr** ➤ A high-end *analog* component video signal. Sometimes called YUV, Component, or Y, R-Y, B-Y, the YPbPr signal by-passes the video decoder in this projector.
- YUV** ➤ See *YPbPr*.

Auxiliary Fan Connector

Auxiliary Fan Connector

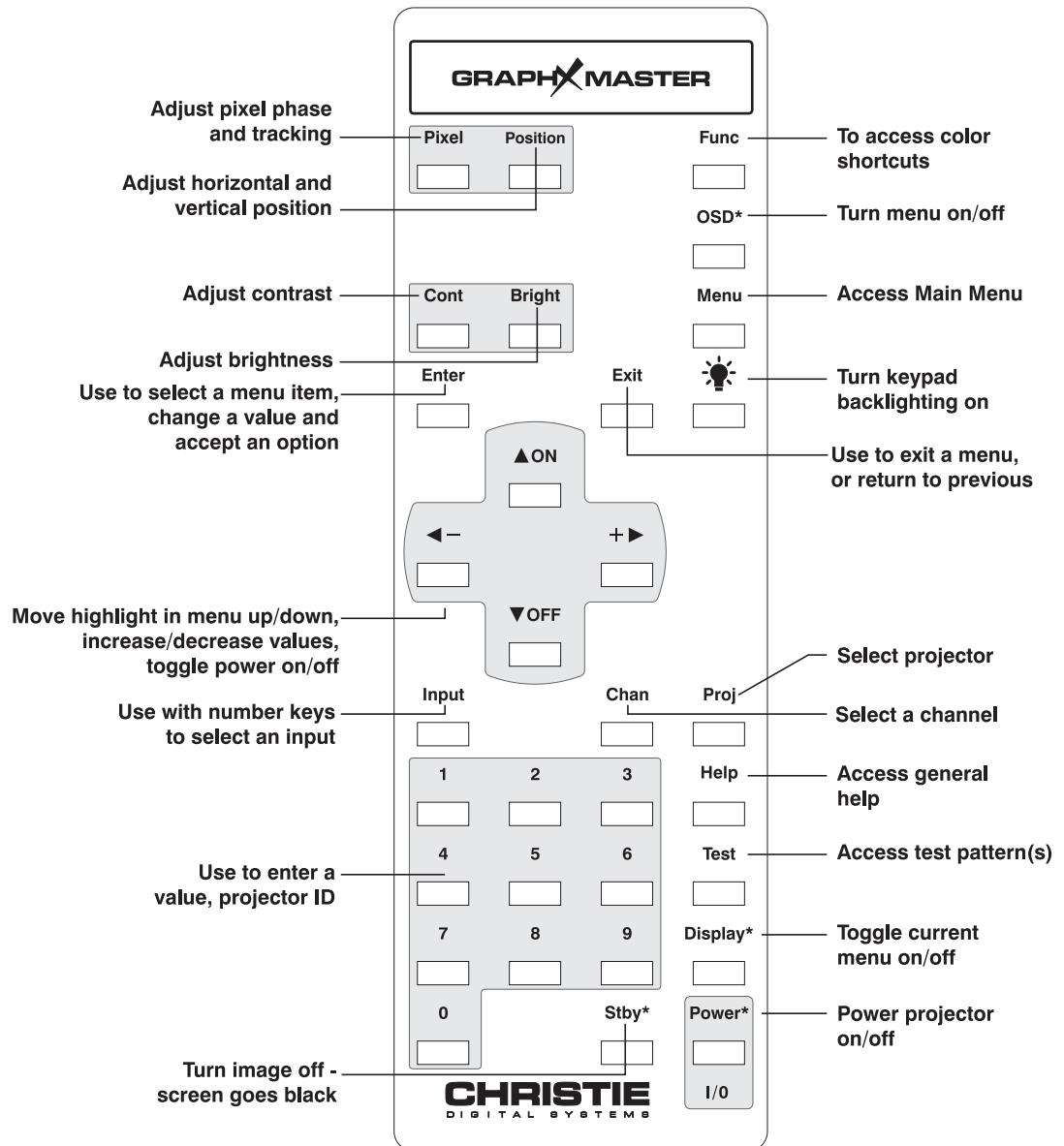
6	3
5	2
4	1

(View looking into connector)

pin 1 -12V (300mA max.)
pin 2 GND
pin 3 DETECT (connect to pin 2 or 4 to enable detection of external fan)
pin 4 GND
pin 5 SENSE (connect to open collector style tachometer output of 3rd wire style fan)
pin 6 +12V (600mA max.)

PCB Connector: AMP 770969-1
Recommended Mating Connector: AMP 172168-1
Recommended Mating Connector Terminals: AMP 770902-1 or 770986-1

Keypad Reference



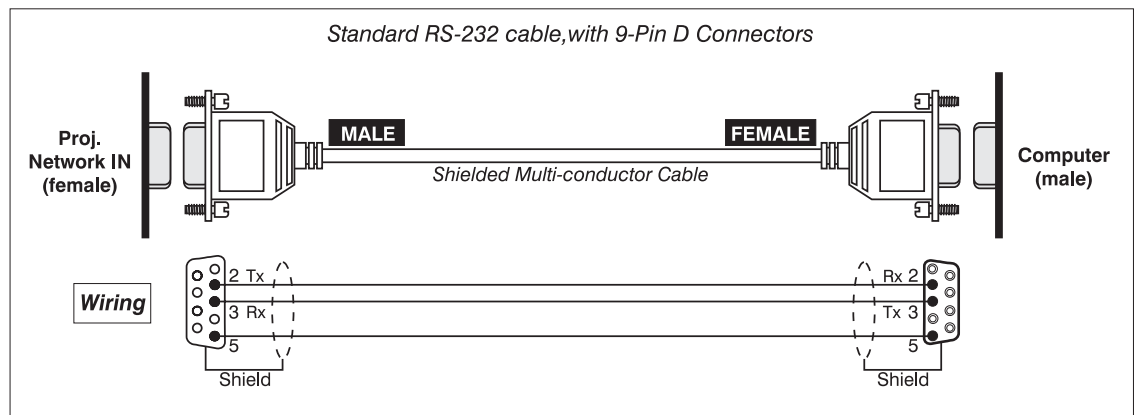
* indicates "Press and Hold" for approximately 1 second to activate the feature.

Serial Communications Cables

When connecting projector to a computer or another projector use the appropriate serial communication shielded cabling as illustrated.

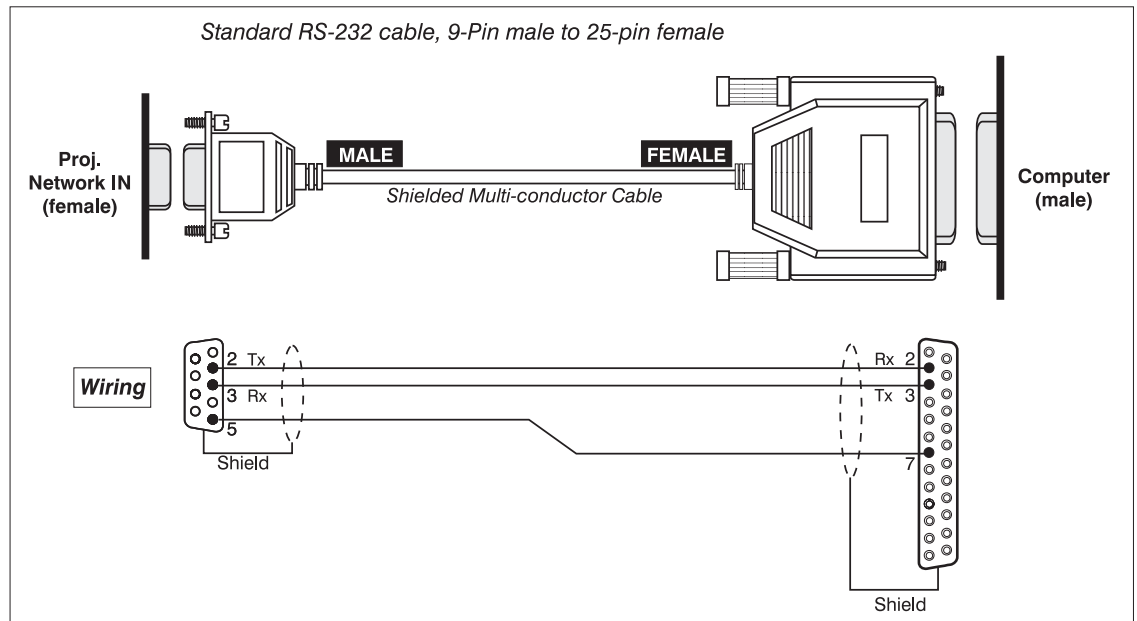
□ From projector to computer (RS-232)

For computers having a 9-pin "AT" type serial port



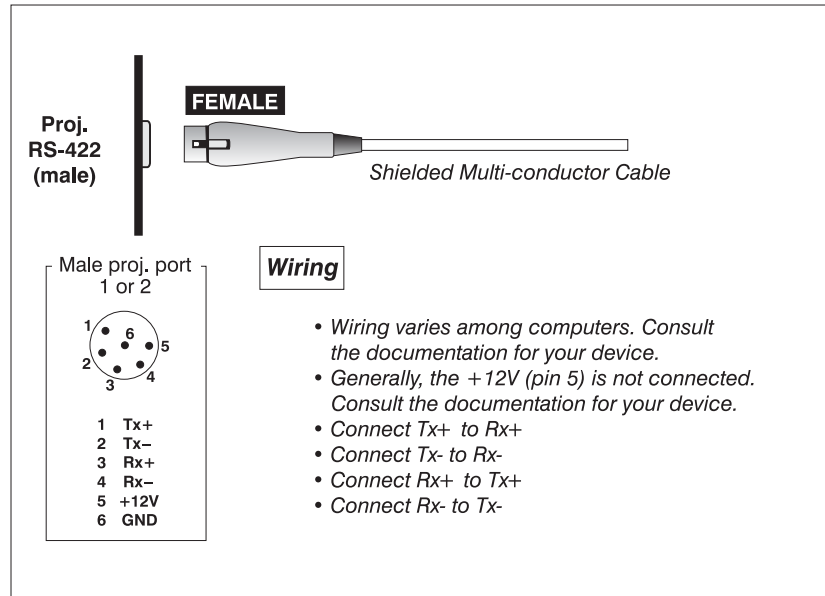
□ From projector to computer (RS-232)

For computers having a 25-pin serial port

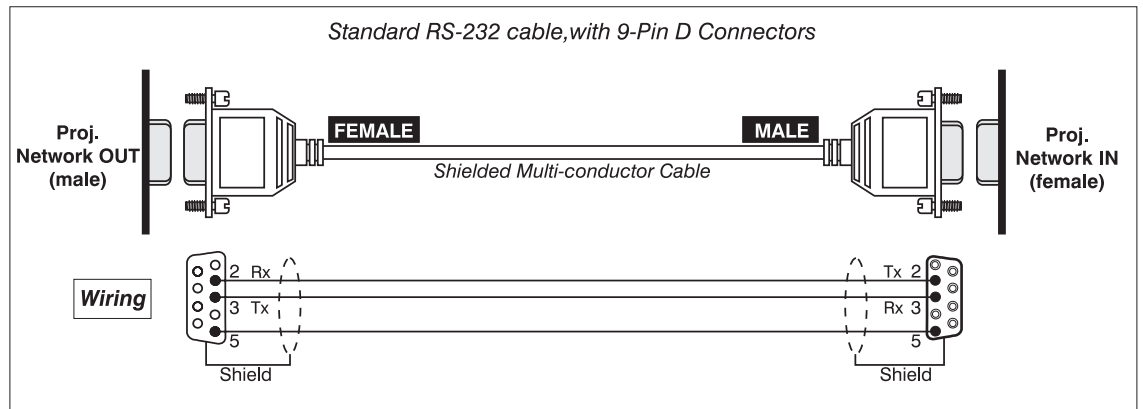


NOTE: RS-422 not available on all projector models – D100U projector models only.

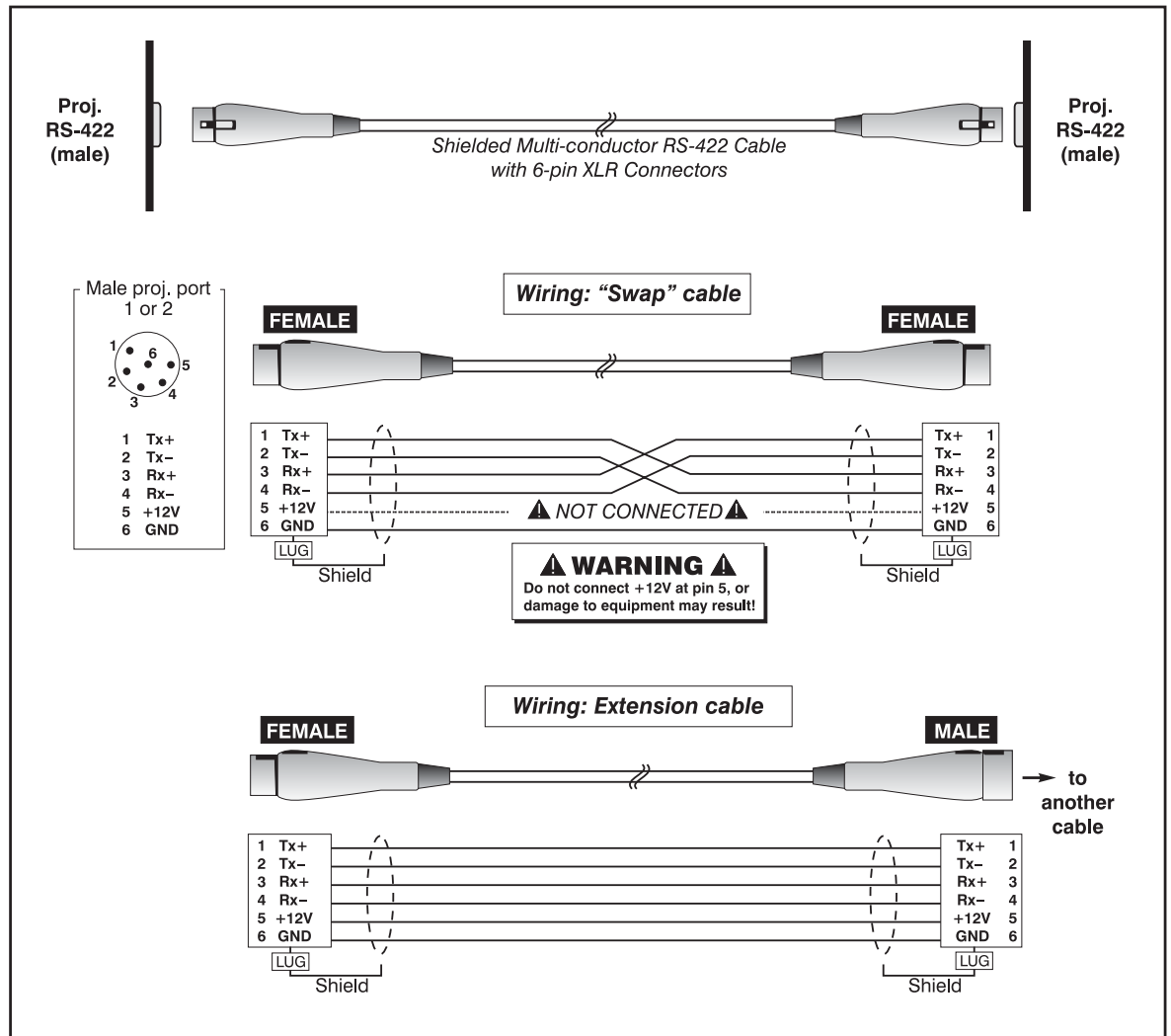
□ From projector to RS-422 compatible computer



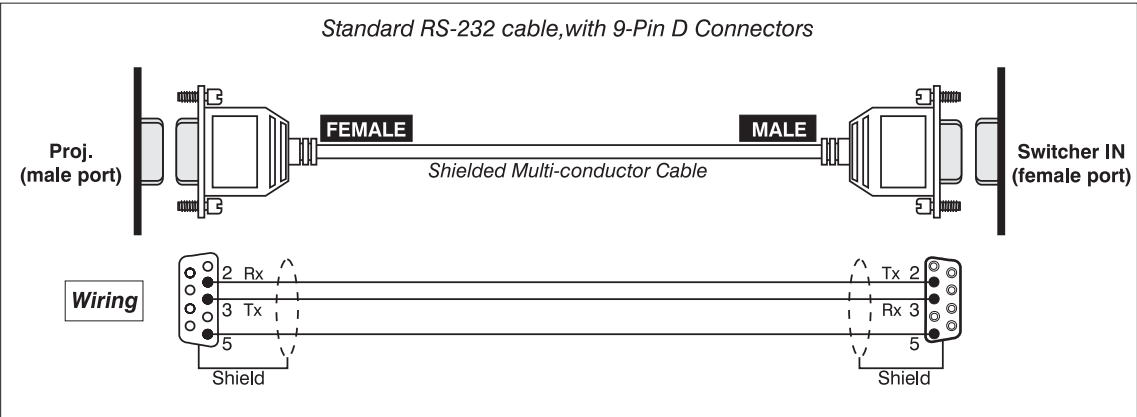
□ From projector to projector (RS-232)



□ From projector to projector (RS-422)

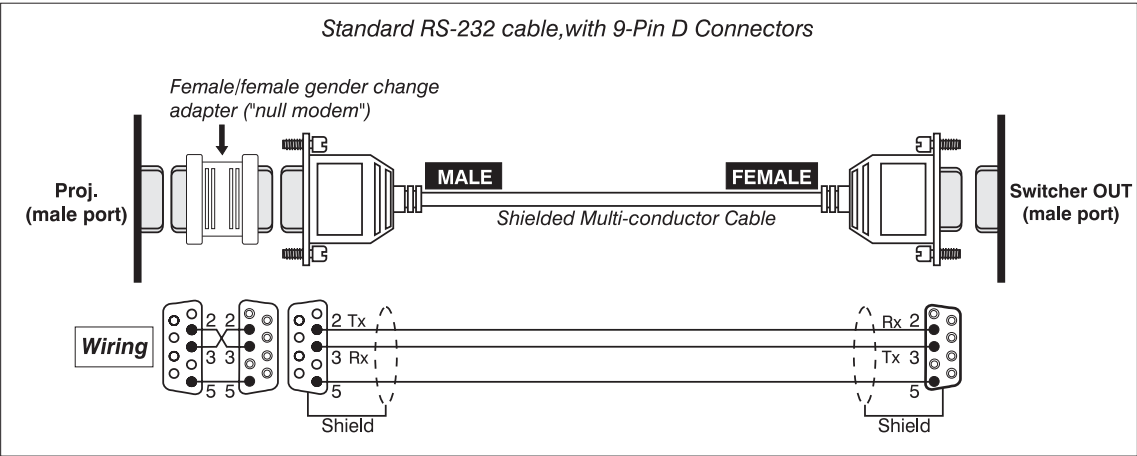


❑ From projector to switcher, new installation



❑ From projector to switcher, in existing Marquee™ installation

For adding a projector to an existing installation in which the switcher OUT port is used (such as with Marquee™ installations), add a gender-changing adapter at the projector port as shown:

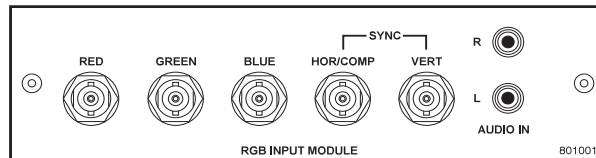


Optional Input Modules

There are many optional input modules and accessories currently available for this projector. Contact your dealer for a complete and up-to-date listing.

NOTE: Always unplug the projector or switcher before installing or removing any optional input module or decoder.

- RGB500 Input Module 38-804606-xx** ➤ The RGB500 Input Module may be installed in this projector, a Marquee Signal Switcher, or a Marquee Case/Power Supply. The module receives analog RGB input signals from computers or other RGB source devices.

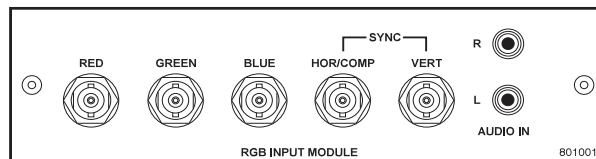


RGB500 Features

- ◇ accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync), up to 500 MHz bandwidth
- ◇ BNC connectors for RGB signal inputs

NOTE: The audio connectors are not functional.

- RGB400BA Input Module 38-804610-xx** ➤ The RGB400 Buffered Amplifier Input Module may be installed in this projector, in a Marquee Signal Switcher or in a Marquee Case/Power Supply. Connect three-, four-, or five-wire RGB video signals of up to 400 MHz bandwidth, signals typically produced by high-resolution computer or workstations. The buffering capability of the module enables the incoming signal to be sent to a remote destination. Inputs are 75 Ω terminated.

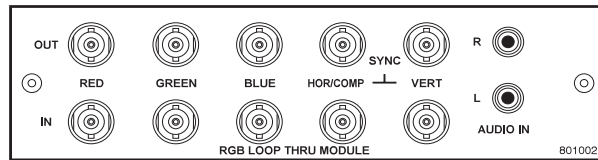


RGB400BA Features

- ◇ accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync)
- ◇ BNC connectors for RGB signal inputs
- ◇ Buffered signals to a remote destination

NOTE: The audio connectors are not functional.

- RGB400 Active Loop-Thru Input Module 38-804607-xx** ➤ The *RGB400 ALT Input Module* may be installed in this projector, a *Marquee Signal Switcher*, or a *Marquee Case/Power Supply*. The module receives analog RGB input signals from computers or other RGB source devices. Video inputs are 75 Ω terminated. Video outputs provide buffered loop-through to another display device.

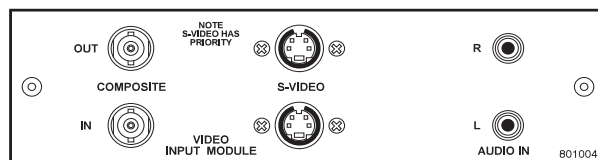


RGB400ALT Features

- ◇ accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync)
- ◇ BNC connectors for RGB signal inputs
- ◇ buffered loop-through video outputs

NOTE: The audio connectors are not functional.

- Composite / S-Video Input Module 38-804608-xx** ➤ The *Composite/S-Video Input Module* may be installed in this projector, with a *Marquee Signal Switcher*. The module receives either composite video or S-video input signals from tape or disk players (do not connect both types of signals simultaneously). Video inputs are 75 Ω terminated. Video outputs are provided for buffered loop-through to another display device.

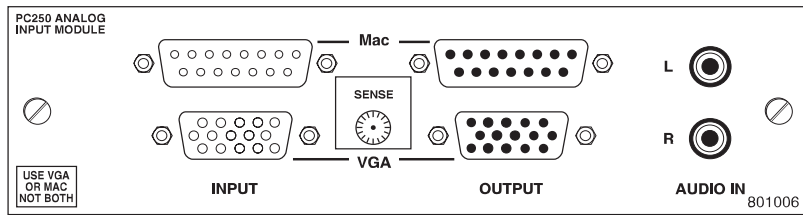


Composite/S-video Features

- ◇ BNC connectors for composite RGB signals
- ◇ 4-pin mini-DIN connectors for S-Video signals
- ◇ buffered loop-through video outputs

NOTES: 1) This interface is not a decoder. NTSC, PAL, or SECAM signals must connect to the video decoder installed at INPUT 3 / INPUT 4. 2) The audio connectors are not functional. 3) For use with this projector, do not connect both composite video and S-video signals to the Composite / S-Video Input Module—connect one or the other, even when plugged into a switcher.

- PC250 Analog Input Module 38-804609-xx** ➤ The *PC250 Analog Input Module* may be installed in this projector, a *Marquee Signal Switcher* or a *Marquee Case/Power Supply*. The module receives analog RGB input signals from IBM PC compatibles or Macintosh computers. Video inputs are 75 Ω terminated. Video outputs are provided for buffered loop-through to another display device.



PC250 Analog Features

- ◇ accepts VGA or MAC RGB video
- ◇ 15 pin D connectors for video
- ◇ active loop-through video outputs

NOTES: 1) This interface does not accept VGA and MAC signals simultaneously. 2) The audio connectors are not functional. 3) Trademarks are the rights of their respective owners.

Digital HDTV Input Module 38-804611-xx

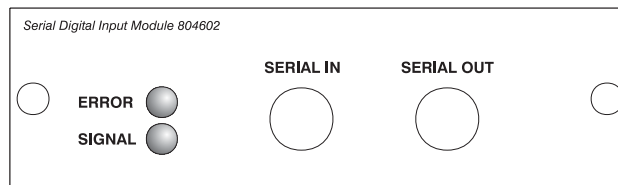
The *Digital HDTV Input Module* can be installed in the projector at **INPUT 2**, where it accepts a digital 4:2:2 component HDTV signal (YCbCr) via a single **SERIAL IN** BNC connector. The signal can loop through the **SERIAL OUT** BNC out to another device (such as another projector). Inputs are 75 Ω terminated.

Features

- ◇ accepts a variety of digital HDTV 4:2:2 component signals (YCbCr), and de-serializes into a parallel 20-bit 4:2:2 component signal (10 bits each for Y and CbCr)
- ◇ SMPTE 292M compatible
- ◇ Two data rates: 1.485 Gb/sec or 1.485/1.001 Gb/sec.
- ◇ provides both a **SERIAL IN** and a **SERIAL OUT** BNC connector
- ◇ includes 4 status LEDs

Serial Digital Input Module 38-804602-xx

The *Serial Digital Input Module (SDI)* can be installed in the projector at **INPUT 2**, where it accepts a serial digital 4:2:2 component video signal (YCbCr) via a single **SERIAL IN** BNC connector. The signal can loop through the **SERIAL OUT** BNC out to another device (such as another projector). Inputs are 75 Ω terminated.

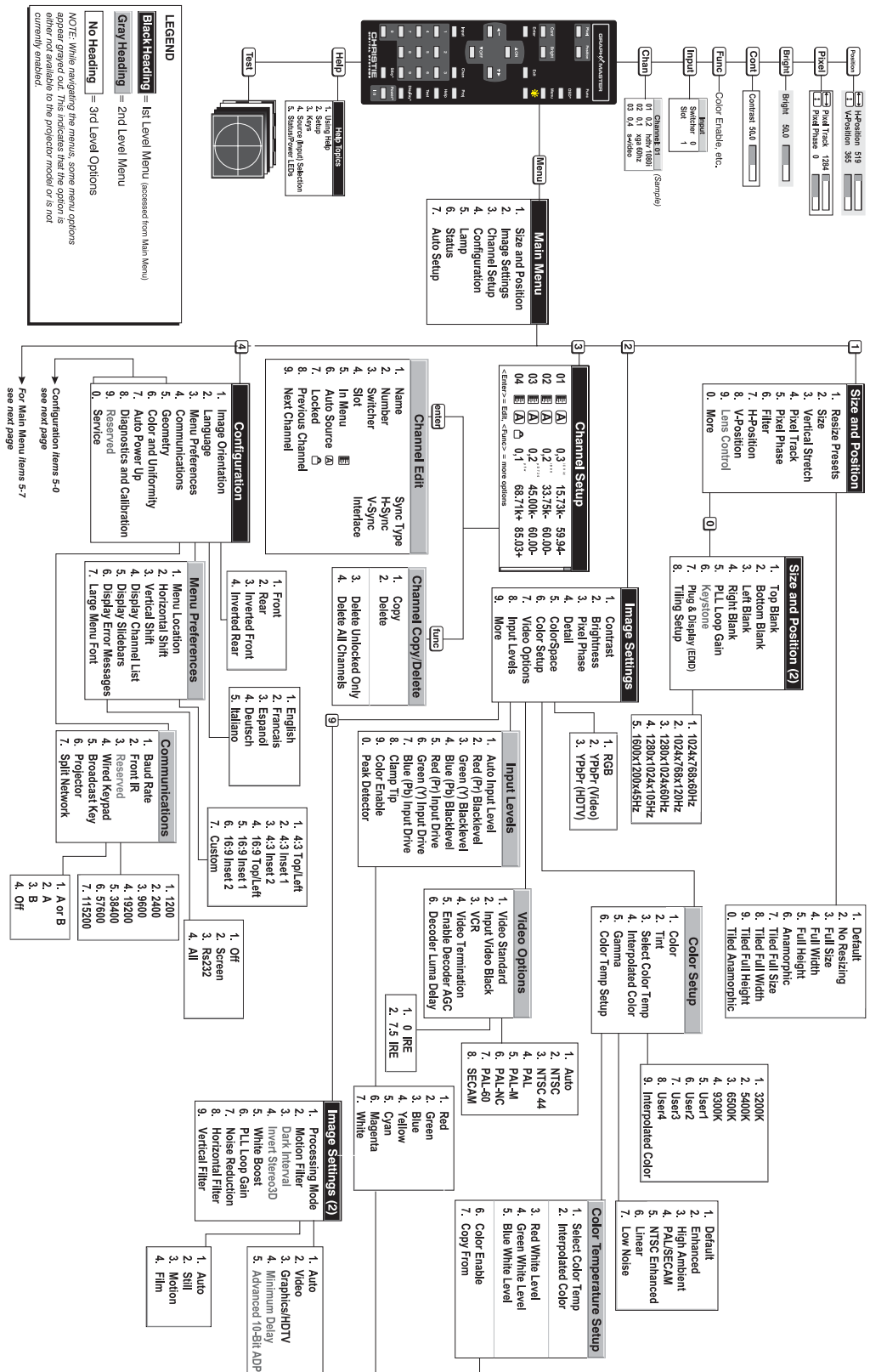


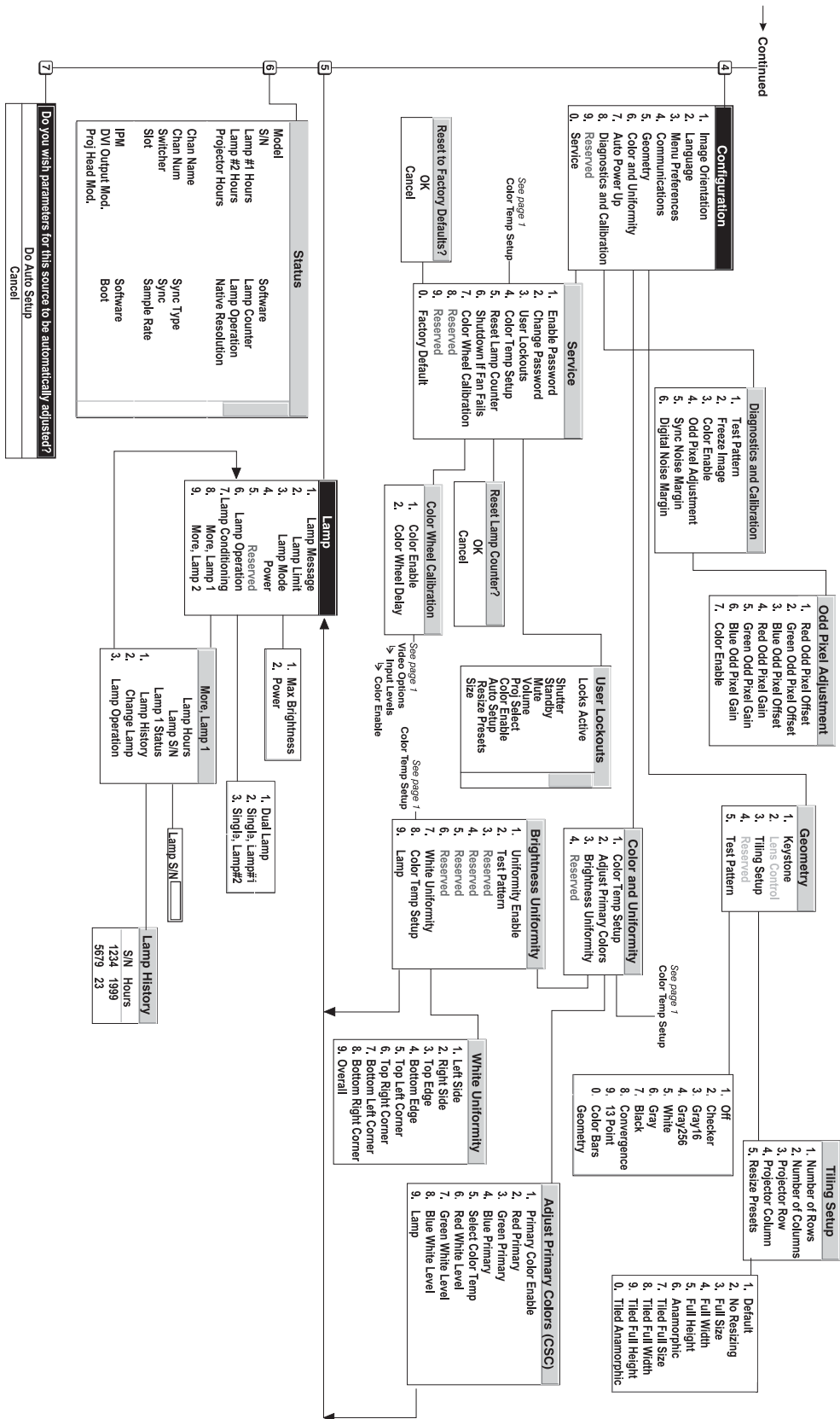
SDI Features

- ◇ accepts serial digital 4:2:2 component video (YCbCr)
- ◇ provides both a **SERIAL IN** and a **SERIAL OUT** BNC connector
- ◇ includes status LEDs for signal and error

Appendix F

Menu Tree





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